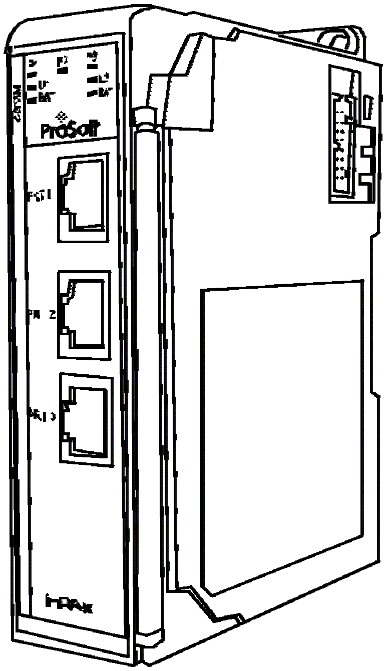
MVI69



MVI69-DFCM

CompactLogix Platform
DF1 Interface Module

User Manual

ProSoft
TECHNOLOGY

Please Read This Notice

Successful application of this module requires a reasonable working knowledge of the Allen-Bradley CompactLogix™ hardware and the application in which the combination is to be used. For this reason, it is important that those responsible for implementation, satisfy themselves that the combination will meet the needs of the application without exposing personnel or equipment to unsafe or inappropriate working conditions.

This manual is provided to assist the user. Every attempt has been made to assure that the information provided is accurate and a true reflection of the product's installation requirements. In order to assure a complete understanding of the operation of the product, the user should read all applicable Allen-Bradley documentation on the operation of the A-B hardware.

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MVI69-DFCM User Manual
June 24, 2004

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1 Product Specifications

The MVI69-DFCM ("DF1 Communication Module") product allows Allen-Bradley CompactLogix™ I/O compatible processors to easily interface with other DF1 protocol compatible devices. Compatible devices include not only Allen-Bradley PLC's (which all support the DF1 protocol) but also a wide assortment of end devices.

1.1 General Specifications

The MVI69-DFCM module acts as a gateway between the DF1 network and the Allen-Bradley backplane. The data transfer from the CompactLogix™ processor is asynchronous from the actions on the DF1 network. A 5000-word register space in the module is used to exchange data between the processor and the DF1 network.

Some of the general specifications include:

- Support for the storage and transfer of up to 5000 registers to/from the CompactLogix processor's controller tags
- Module memory usage that is completely user definable
- Two ports to emulate any combination of DF1 master or slave device
- Configurable parameters include:

Protocol	:	Full- or half-duplex
Termination Type		BCC or CRC
Local Station ID		0 to 254
Baud Rate	:	110 to 115,200
Parity	:	None, Odd and Even
Stop Bits	:	1 or 2
RTS On and Off Timing	:	0 to 65535 milliseconds
Minimum Response Delay	:	0 to 65535 milliseconds
Use of CTS Modem Line	:	Yes or No
ENQ Delay		0 to 65535 milliseconds
Response Timeout		0 to 65535 milliseconds
Retry Count		0 to 10

- Address 255 is used for broadcast messages.

1.1.1 Slave Functional Specifications

The MVI69-DFCM module accepts DF1 commands from an attached DF1 master unit. A port configured as a virtual DF1 slave permits a remote master to interact with all data contained in the module. This data can be derived from other DF1 slave devices on the network through a master port or from the CompactLogix processor.

1.1.2 Master Functional Specifications

A port configured as a virtual DF1 master device on the MVI69-DFCM module will actively issue DF1 commands to other nodes on the DF1 network. One hundred commands are supported on each port. Additionally, the master ports have an optimized polling characteristic that will poll slaves with communication problems less frequently. The CompactLogix processor can be programmed to control the activity on the port by actively selecting commands from the command list to execute or issuing commands directly from the ladder logic. The CompactLogix processor also has the ability to control the scanning of slaves on the port.

1.1.3 Physical

This module is designed by ProSoft Technology and incorporates licensed technology from Allen-Bradley (CompactLogix backplane technology).

- CompactLogix Form Factor - Single Slot
- Connections :
    - RJ45 connectors for DF1 support of RS-232, RS-422 or RS-485 interfaces
    - 1 – RJ45 RS-232 Configuration Tool Connector

1.1.4 CompactLogix Interface

- Operation via simple ladder logic
- Complete monitoring of module through RSLogix 5000 software
- CompactLogix backplane interface via I/O access
- All data related to the module is contained in a single controller tag with defined objects to ease in the monitoring and interfacing with the module

1.2 Hardware Specifications

The MVI69-DFCM module is designed by ProSoft Technology and incorporates licensed technology from Allen-Bradley (CompactLogix backplane technology).

Current Loads	800 mA @ 5V (from backplane)
Operating Temperature	0 to 60° C 32 to 140° F
Storage Temperature	-40 to 85°C -40 to 185° F
Relative Humidity	5 – 95% (w/o condensation)
DF1 Port Connector	Two RJ45 connectors (RJ45 to DB9 cable shipped with unit (supporting RS-232, RS-422 and RS-485 interfaces (RJ45 to DB9 cables shipped with unit.
Configuration Connector	RJ45 RS-232 Connector (RJ45 to DB9 cable shipped with unit.

2 Functional Overview

This section provides a functional overview of the MVI69-DFCM module. A thorough understanding of the information contained in this document is required for successful implementation of the module in a user application. If you are not familiar with the data transfer and DF1 protocol operations, read this document before setting up the module.

2.1 General Concepts

The following discussion covers several concepts that are key to understanding the operation of the MVI69-DFCM module.

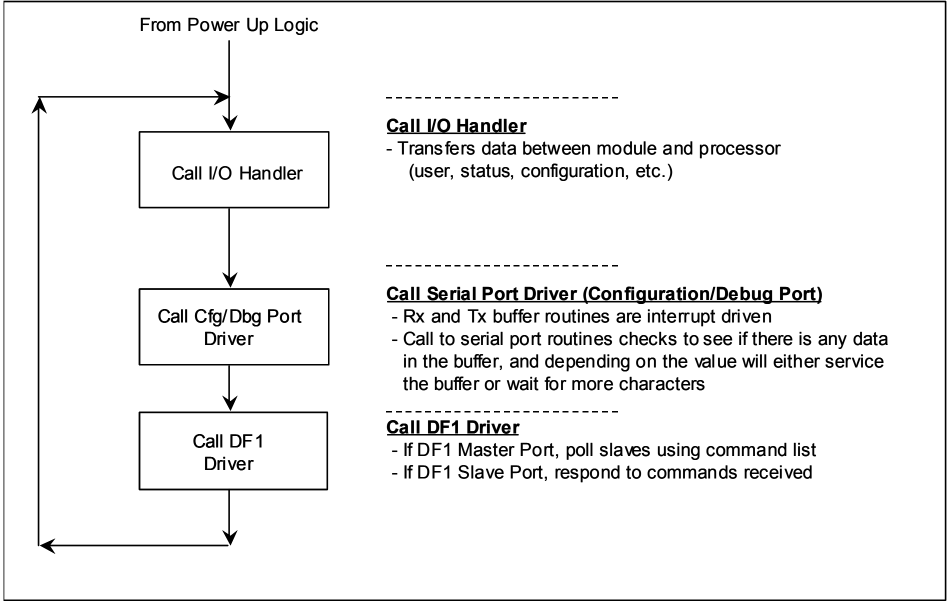
2.1.1 Module Power Up

- On power up the module begins performing the following logical functions:
- Initialize hardware components
  - Initialize CompactLogix backplane driver
  - Test and Clear all RAM
  - Initialize the serial communication ports
- Read module configuration from the Compact Flash
- Initialize Module Register space
- Enable Slave Driver on selected ports
- Enable Master Driver on selected ports

Once this initialization procedure is complete, the module will begin communicating with other nodes on the network, depending on the configuration.

2.1.2 Main Logic Loop

Upon completing the power up configuration process, the module enters an infinite loop that performs the following functions:



Call I/O Handler
- Transfers data between module and processor (user, status, configuration, etc.)

Call Serial Port Driver (Configuration/Debug Port)
- Rx and Tx buffer routines are interrupt driven
- Call to serial port routines checks to see if there is any data in the buffer, and depending on the value will either service the buffer or wait for more characters

Call DF1 Driver
- If DF1 Master Port, poll slaves using command list
- If DF1 Slave Port, respond to commands received

2.1.3 Backplane Data Transfer

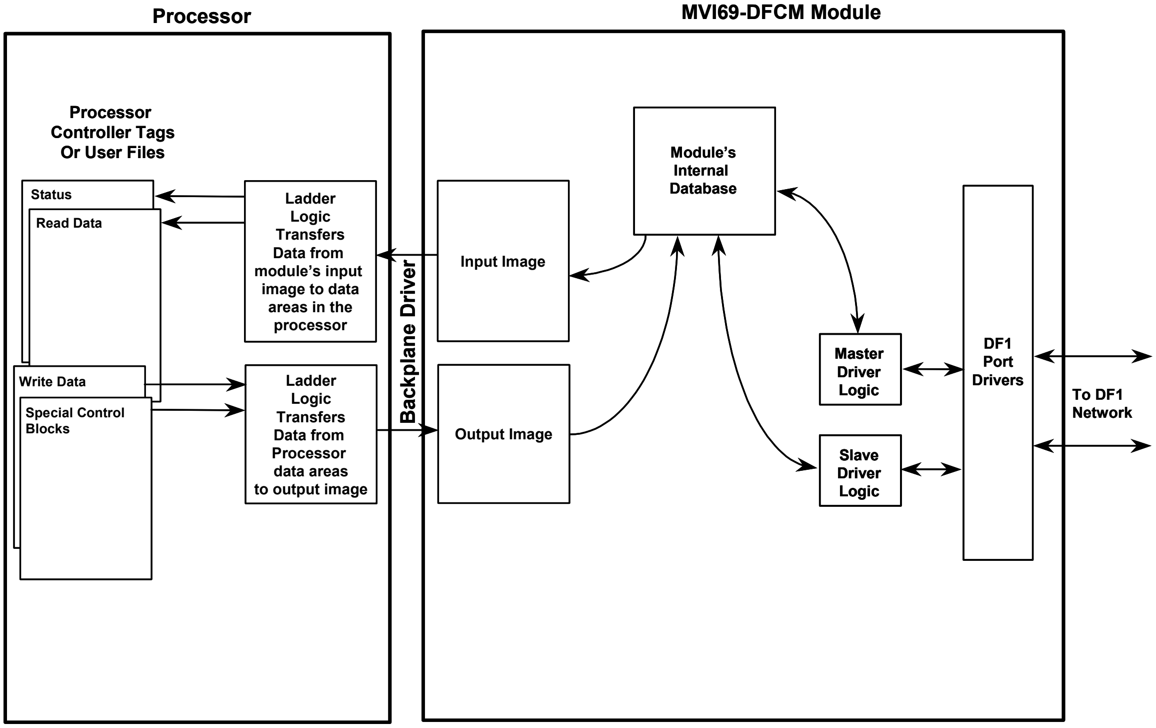
The MVI69-DFCM module is unique in the way that the CompactLogix backplane is utilized. Data is paged between the module and the CompactLogix processor across the backplane using the module's input and output images. The update frequency of the images is determined by the scheduled scan rate defined by the user for the module and the communication load on the module. Typical updates are in the range of 2 to 10 milliseconds.

The data is paged between the processor and the module using input and output image blocks. You can configure the size of the blocks using the Block Transfer Size parameter in the configuration file. You can configure blocks of 60, 120, or 240 words of data depending on the number of words allowed for your own application.

This bi-directional transference of data is accomplished by the module filling in data in the module's input image to send to the processor. Data in the input image is placed in the Controller Tags in the processor by the ladder logic. The input image for the module may be set to 62, 122, or 242 words depending on the block transfer size parameter set in the configuration file.

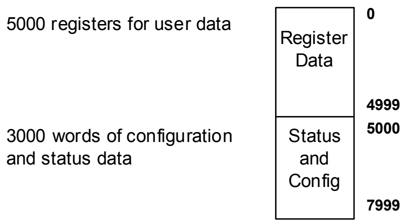
The processor inserts data to the module's output image to be transferred to the module. The module's program extracts the data and places it in the module's internal database. The output image for the module may be set to 61, 121, or 241 words depending on the block transfer size parameter set in the configuration file.

The following diagram displays the data transfer method used to move data between the CompactLogix processor, the MVI69-DFCM module and the DF1 network.


Processor
MVI69-DFCM Module
Processor Controller Tags Or User Files
Status
Read Data
Write Data
Special Control Blocks
Ladder Logic Transfers Data from module's input image to data areas in the processor
Ladder Logic Transfers Data from Processor data areas to output image
Backplane Driver
Input Image
Output Image
Module's Internal Database
Master Driver Logic
Slave Driver Logic
DF1 Port Drivers
To DF1 Network

As shown in the diagram above, all data transferred between the module and the processor over the backplane is through the input and output images. Ladder logic must be written in the CompactLogix processor to interface the input and output image data with data defined in the Controller Tags. All data used by the module is stored in its internal database. The diagram below displays the layout of the database:

Module’s Internal Database Structure


5000 registers for user data
Register Data
0
4999
3000 words of configuration and status data
Status and Config
5000
7999

Data contained in this database is paged through the input and output images by coordination of the CompactLogix ladder logic and the MVI69-DFCM module's program. Up to 242 words of data can be transferred from the module to the processor at once. Up to 241 words of data can be transferred from the processor to the module. The read and write block identification codes in each data block determine the function to be performed or the content of the data block. The block identification codes used by the module are listed below:

Block Range	Descriptions
-1	Status Block
0	Status Block
1 to 999	Read or write data
1000	Event Port 1
2000	Event Port 2
3000 to 3001	Port 1 slave polling control
3002 to 3006	Port 1 slave status
3100 to 3101	Port 2 slave polling control
3102 to 3106	Port 2 slave status
5000 to 5006	Port 1 command control
5100 to 5106	Port 2 command control
9972	Set module time using received time
9973	Pass module time to processor
9998	Warm-boot control block
9999	Cold-boot control block

Each image has a defined structure depending on the data content and the function of the data transfer as defined in the sections below:

2.2 Normal Data Transfer

Normal data transfer includes the paging of the user data found in the module's internal database in registers 0 to 4999 and the status data. These data are transferred through read (input image) and write (output image) blocks. The structure and function of each block is discussed in the following sections:

2.2.1 Read Block

These blocks of data are used to transfer information from the module to the CompactLogix processor. The structure of the input image used to transfer this data is shown below:

Offset	Description	Length
0	Read Block ID	1
1	Write Block ID	1
2 to (n+1)	Read Data	n

where

n = 60, 120, or 240 depending on the Block Transfer Size parameter (refer to the configuration file).

The Read Block ID is an index value used to determine the location of where the data will be placed in the CompactLogix processor controller tag array of module read data. The number of data words per transfer depends on the configured Block Transfer Size parameter in the configuration file (possible values are 60, 120, or 240).

The Write Block ID associated with the block is used to request data from the CompactLogix processor. Under normal, program operation, the module sequentially sends read blocks and requests write blocks. For example, if three read and two write blocks are used with the application, the sequence will be as follows:

R1W1-->R2W2-->R3W1-->R1W2-->R2W1-->R3W2-->R1W1-->

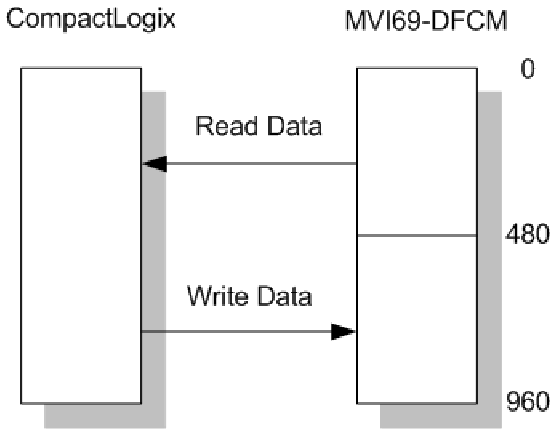
This sequence will continue until interrupted by other write block numbers sent by the controller or by a command request from a node on the DF1 network or operator control through the module's Configuration/Debug port.

The following example shows a typical backplane communication application.

Assume that the backplane parameters are configured as follows:

```
Read Register Start:    0
Read Register Count:    480
Write Register Start:   480
Write Register Count:   480
```

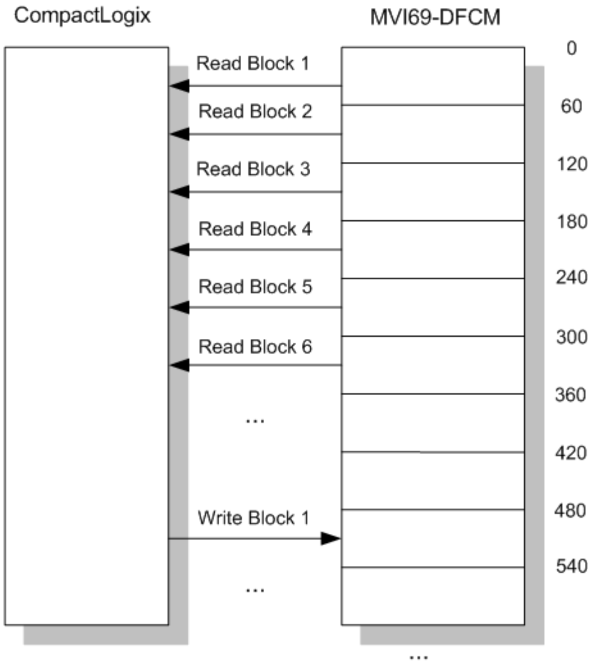
The backplane communication would be configured as follows:



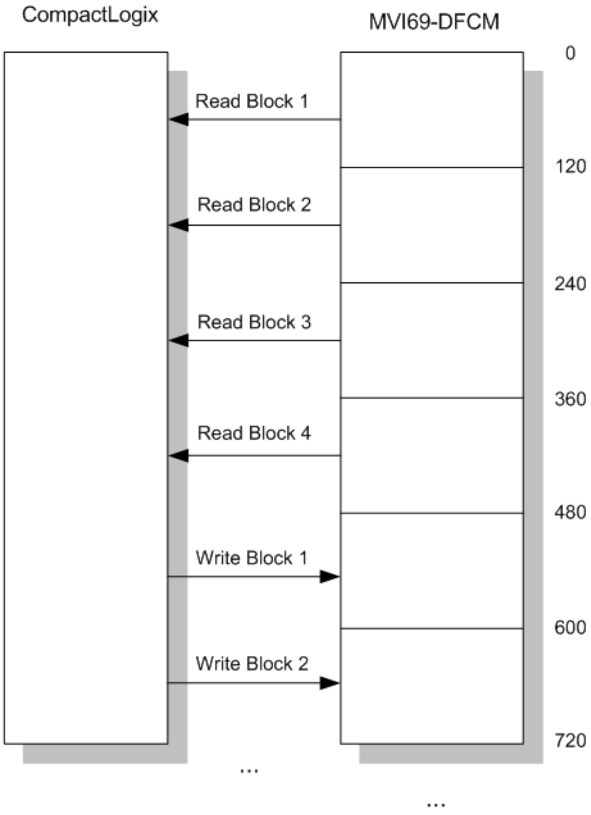
Database address 0 to 479 will be continuously transferred from the module to the processor. Database address 480 to 959 will continuously be transferred from the processor to the module.

The Block Transfer Size parameter basically configures how the Read Data and Write Data areas are broken down into data blocks (60, 120, or 240).

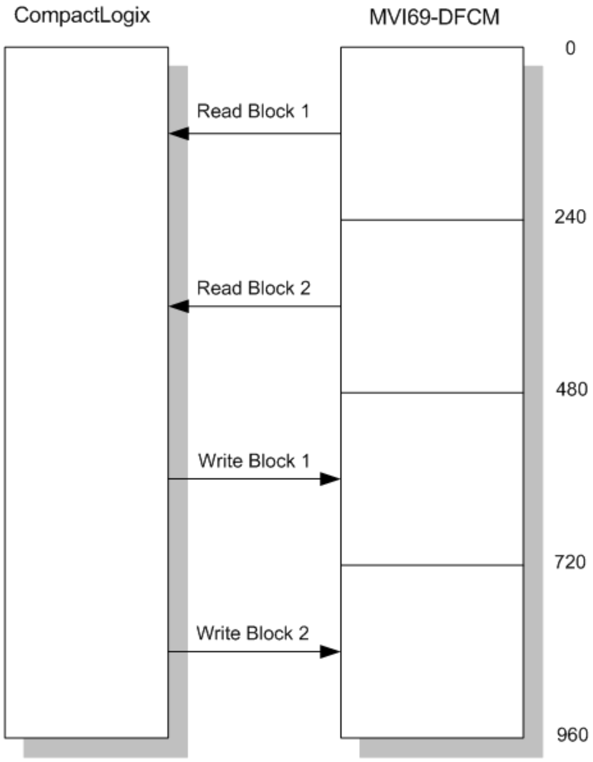
If Block Transfer Size = 60:



If Block Transfer Size = 120:



If Block Transfer Size = 240:



2.2.2 Write Block

These blocks of data are used to transfer information from the CompactLogix processor to the module. The structure of the output image used to transfer this data is shown below:

Offset	Description	Length
0	Write Block ID	1
1 to n	Write Data	n

where *n* = 60, 120, or 240 depending on the Block Transfer Size parameter (refer to the configuration file).

The Write Block ID is an index value used to determine the location in the module's database where the data will be placed. Each transfer can move up to 200 words (block offsets 1 to 200) of data.

2.3 Special Blocks

2.3.1 Slave Status Blocks

Slave status blocks are used to send status information of each slave device on a master port. Slaves attached to the master port can have one of the following states:

State	Description
0	The slave is inactive and not defined in the command list for the master port.
1	The slave is actively being polled or controlled by the master port and communications is successful.
2	The master port has failed to communicate with the slave device. Communications with the slave is suspended for a user defined period based on the scanning of the command list.
3	Communications with the slave has been disabled by the ladder logic. No communication will occur with the slave until this state is cleared by the ladder logic.

Slaves are defined to the system when the module initializes the master command list. Each slave defined will be set to a state of one in this initial step. If the master port fails to communicate with a slave device (retry count expired on a command), the master will set the state of the slave to a value of 2 in the status table. This suspends communication with the slave device for a user specified scan count (**Error Delay Count** parameter in the configuration file). Each time a command in the list is scanned that has the address of a suspended slave, the delay counter value will be decremented. When the value reaches zero, the slave state will be set to one.

In order to read the slave status table, you should refer to the sample ladder logic. The ladder logic must send a special block to the module to request the data. Each port has a specific set of blocks to request the data as follows:

BLOCK ID	DESCRIPTION
3002	Request status for slaves 0 to 59 for Port 1
3003	Request status for slaves 60 to 119 for Port 1
3004	Request status for slaves 120 to 179 for Port 1
3005	Request status for slaves 180 to 239 for Port 1
3006	Request status for slaves 240 to 255 for Port 1
3102	Request status for slaves 0 to 59 for Port 2
3103	Request status for slaves 60 to 119 for Port 2
3104	Request status for slaves 120 to 179 for Port 2
3105	Request status for slaves 180 to 239 for Port 2
3106	Request status for slaves 240 to 255 for Port 2

The format of these blocks is as shown below:

Write Block – Request Slave Status

Offset	Description	Length
0	3002 – 3006 or 3102 – 3106	1
1 to n	Spare	n

n=60, 120, or 240 depending on what is entered in the Block Transfer Size parameter (see the configuration file).

The module will recognize the request by receiving the special write block code and respond with a read block with the following format:

Read Block – Read Slave Status

Offset	Description	Length
0	3002-3006 or 3102-3106	1
1	Write Block ID	1
2-61	Slave Poll Status Data	60
62 to n	Spare (if present)	

The sample ladder logic shows how to override the value in the slave status table to disable slaves (state value of 3) by sending a special block of data from the processor to the slave. Port 1 slaves are disabled using block 3000, and Port 2 slaves are disabled using block 3100. Each block contains the slave node addresses to disable. The structure of the block is displayed below:

Write Block – Disable Slaves

Offset	Description	Length
0	3000 or 3100	1
1	Number of slaves in block	1
2 to 61	Slave indexes	60
62 to (n+1)	Spare	

n=120, or 240 (if configured)

The module will respond with a block with the same identification code received and indicate the number of slaves acted on with the block. The format of this response block is displayed below:

Read Block – Disable Slaves

Offset	Description	Length
0	3000 or 3100	1
1	Write Block ID	1
2	Number of slaves processed	1
3 to (n+1)	Spare	

n=60, 120, or 240 (if configured)

The sample ladder logic explains how to override the value in the slave status table to enable the slave (state value of 1) by sending a special block. Port 1 slaves are enabled using block 3001, and Port 2 slaves are enabled using block 3101. Each block contains the slave node addresses to enable. The format of the block is displayed below:

Write Block – Enable Slaves

Offset	Description	Length
0	3001 or 3101	1
1	Number of slaves in block	1
2	Slave indexes	1

3 to n	Spare	

n=60, 120, or 240 depending on what is entered in the Block Transfer Size parameter (see the configuration file).

The module will respond with a block with the same identification code received and indicate the number of slaves acted on with the block. The format of this response block is displayed below:

Read Block – Enable Slaves

Offset	Description	Length
0	3001 or 3101	1
1	Write Block ID	1
2	Number of slaves processed	1
3-n	Spare	

n=60, 120, or 240 depending on what is entered in the Block Transfer Size parameter (see the configuration file).

Important: The slaves are enabled by default. Therefore, this block should only be used after Block 3000 or 3001 to re-enable the slaves.

2.4 Command Control Blocks

Command control blocks are special blocks used to control the module or request special data from the module. The current version of the software supports five command control blocks: event command control, command control, transfer time, warm boot and cold boot.

2.4.1 Event Command

Event command control blocks are used to send DF1 commands directly from the ladder logic to one of the master ports. The format for these blocks is displayed below:

Write Block – Event Command

Offset	Description	Length
0	1000 or 2000	1
1	Internal DB Address	1
2	Point Count	1
3	Swap Code	1
4	Node Address	1
5	Function Code	1
6	Parameter #1	1
7	Parameter #2	1
8	Parameter #3	1
9	Parameter #4	1
10 to n	Spare	

n=60, 120, or 240 depending on what is entered in the Block Transfer Size parameter (see the configuration file).

The block number defines the DF1 port to be considered. Block 1000 commands are directed to Port 1, and block 2000 commands are directed to Port 2. The parameters passed with the block are used to construct the command. The **Internal DB Address** parameter specifies the module's database location to associate with the command. The **Point Count** parameter defines the number of registers for the command. The **Swap Code** is used to change the word or byte order. The **Node Address** parameter is used to define the device on the DF1 network to consider. The **Function Code** parameter is one of those defined in the ProSoft DF1 Command Set documentation. The parameter fields in the block should be completed as required by the selected function code. Each command has its own set of parameters. When the block is received, the module will process it and place the command in the command queue. The module will respond to each event command block with a read block with the following format:

Read Block – Event Command

Offset	Description	Length
0	1000 or 2000	1
1	Write Block ID	1
2	0=Fail, 1=Success	1
3 to n	Spare	

n=60, 120, or 240 depending on what is entered in the Block Transfer Size parameter (see the configuration file).

Word two of the block can be used by the ladder logic to determine if the command was added to the command queue of the module. The command will only fail if the command queue for the port is full (100 commands for each queue) or the command requested is invalid.

2.4.2 Command Control

Command control blocks are used to place commands in the command list into the command queue. Each port has a command queue of up to 100 commands. The module services commands in the queue before the master command list. This gives high priority to commands in the queue. Commands placed in the queue through this mechanism must be defined in the master command list. Under normal command list execution, the module will only execute commands with the Enable parameter set to one or two. If the value is set to zero, the command is skipped. Commands may be placed in the command list with an Enable parameter set to zero. These commands can then be executed using the command control blocks.

One to six commands can be placed in the command queue with a single request. The format of the block is displayed in the following table:

Write Block – Command Control

Offset	Description	Length
0	5001-5006 or 5101-5106	1
1	Command index	1
2	Command index	1
3	Command index	1
4	Command index	1

5	Command index	1
6	Command index	1
7 to n	Spare	

n=60, 120, or 240 depending on what is entered in the Block Transfer Size parameter (see the configuration file).

Blocks in the range of 5001 to 5006 are used for Port 1, and blocks in the range of 5101 to 5106 are used for Port 2. The last digit in the block code defines the number of commands to process in the block. For example, a block code of 5003 contains 3 command indexes that are to be used with Port 1. The Command index parameters in the block have a range of 0 to 99 and correspond to the master command list entries. The module responds to a command control block with a block containing the number of commands added to the command queue for the port. The format of the block is displayed below:

Read Block – Command Control

Offset	Description	Length
0	5000-5006 or 5100-5106	1
1	Write Block ID	1
2	Number of commands added to command queue	1
3 to (n+1)	Spare	

n=60, 120, or 240 depending on what is entered in the Block Transfer Size parameter (see the configuration file).

2.4.3 Set Module Time Using Processor Time

This block can be used to update the module’s internal clock (date and time).

Write Block – Set Module Time

Offset	Description	Length
0	9972	1
1	Year (0-9999)	1
2	Month (1-12)	1
3	Day (1-31)	1
4	Hour (0-23)	1
5	Minutes (0-59)	1
6	Seconds (0-59)	1
7 to n	Spare	

n=60, 120, or 240 depending on what is entered in the Block Transfer Size parameter (see the configuration file).

Set Module Time Response

Read Block – Set Module Time

Offset	Description	Length
0	9972	1
1	Write Block ID	1
2 to (n+1)	Spare	

n=60, 120, or 240 depending on what is entered in the Block Transfer Size parameter (see the configuration file).

Get Module Time for Processor Time

Write Block – Get Module Time

Offset	Description	Length
0	9973	1
1 to n	Spare	

n=60, 120, or 240 depending on what is entered in the Block Transfer Size parameter (see the configuration file).

Read Block – Write Module TIme

Offset	Description	Length
0	9973	1
1	Write Block ID	1
2	Year (0-9999)	1
3	Month (1-12)	1
4	Day (1-31)	1
5	Hour (0-23)	1
6	Minutes (0-59)	1
7	Seconds (0-59)	1
8 to n	Spare	

n=60, 120, or 240 depending on what is entered in the Block Transfer Size parameter (see the configuration file).

2.4.4 Warm Boot

This block is sent from the CompactLogix processor to the module (output image) when the module is required to perform a warm-boot (software reset) operation. The structure of the control block is shown below:

Offset	Description	Length
0	9998	1
1 to n	Spare	247

n=60, 120, or 240 depending on what is entered in the Block Transfer Size parameter (see the configuration file).

Cold Boot

This block is sent from the CompactLogix processor to the module (output image) when the module is required to perform the cold boot (hardware reset) operation. This block is sent to the module when a hardware problem is detected by the ladder logic that requires a hardware reset. The structure of the control block is shown below:

Offset	Description	Length
0	9999	1
1 to n	Spare	247

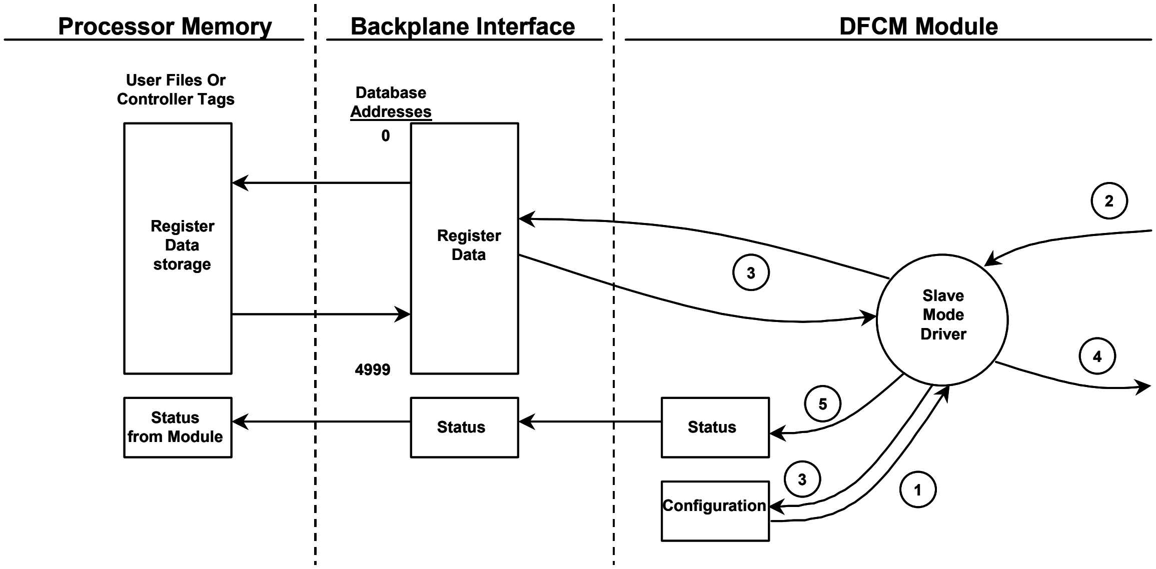
n=60, 120, or 240 depending on what is entered in the Block Transfer Size parameter (see the configuration file).

2.5 Data Flow between MVI69-DFCM Module and CompactLogix Processor

The following discussion details the flow of data between the two pieces of hardware (CompactLogix processor and MVI69-DFCM module) and other nodes on the DF1 network under the module's different operating modes. Each port on the module is configured to emulate a DF1 master device or a DF1 slave device. The operation of each port is dependent on this configuration. The sections below discuss the operation of each mode.

2.5.1 Slave Driver Mode

The Slave Driver Mode allows the MVI69-DFCM module to respond to data read and write commands issued by a master on the DF1 network. The following flow chart and associated table detail the flow of data into and out of the module.



Step	Description
1	The DF1 slave port driver receives the configuration information from the internal Compact Flash disk. This information is used to configure the serial port and define the slave node characteristics. The module simulates N-files to permit remote access of the database. Each file has a configurable length of 60, 120, or 240-word registers.
2	A Host device, such as an Allen-Bradley PLC or an MMI package issues a read or write command to the module's node address. The port driver qualifies the message before accepting it into the module.
3	Once the module accepts the command, the data is immediately transferred to or from the internal database in the module. If the command is a read command, the data is read out of the database and a response message is built. If the command is a write command, the data is written directly into the database and a response message is built.
4	Once the data processing has been completed in Step 3, the response is issued to the originating master node.
5	Counters are available in the Status Block that permit the ladder logic program to determine the level of activity of the Slave Driver.

Review the **Module Set Up** section for a complete list of the parameters that must be defined for a slave port. The slave driver supports the following DF1 command set:

Basic Command Set Functions

Command	Function	Definition	Supported in Slave
0x00	N/A	Protected Write	X
0x01	N/A	Unprotected Read	X
0x02	N/A	Protected Bit Write	X
0x05	N/A	Unprotected Bit Write	X
0x06	0x00	Echo Request	X
0x06	0x03	Status Request	X
0x08	N/A	Unprotected Write	X

PLC-5 Command Set Functions

Command	Function	Definition	Supported in Slave
0x0F	0x00	Word Range Write (Binary Address)	X
0x0F	0x01	Word Range Read (Binary Address)	X
0x0F	0x26	Read-Modify-Write (Binary Address)	
0x0F	0x00	Word Range Write (ASCII Address)	X
0x0F	0x01	Word Range Read (ASCII Address)	X
0x0F	0x26	Read-Modify-Write (ASCII Address)	

SLC-500 Command Set Functions

Command	Function	Definition	Supported in Slave
0x0F	0xA1	Protected Typed Logical Read With Two Address Fields	X
0x0F	0XA2	Protected Typed Logical Read With Three Address Fields	X
0x0F	0XA9	Protected Typed Logical Write With Two Address Fields	X
0x0F	0XAA	Protected Typed Logical Write With Three Address Fields	X
0x0F	0XAB	Protected Typed Logical Write With Mask (Three Address Fields)	X

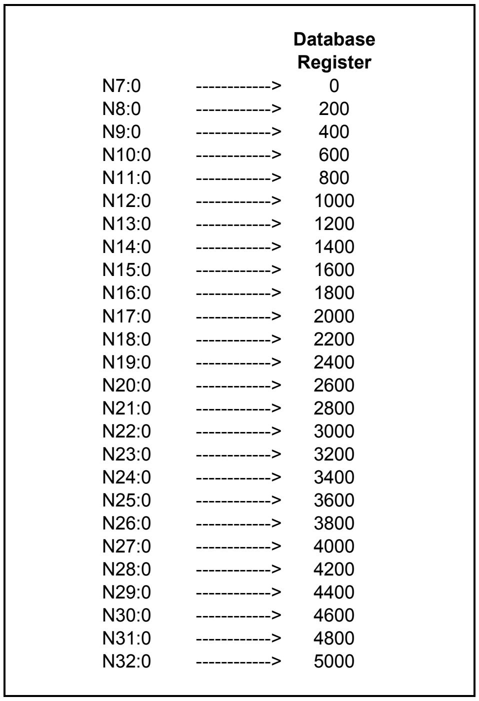
The PLC-5 and SLC-500 command set require the use of files. These files are emulated in the module. The module defines these files depending on the following parameters in the configuration file:

- First File
- File Size
- File Offset

For example, if these parameters are configured as:

```
First File:  7
File Size:   200
File Offset: 0
```

The database would be emulated as shown in the following table:



		Database Register
N7:0	------------>	0
N8:0	------------>	200
N9:0	------------>	400
N10:0	------------>	600
N11:0	------------>	800
N12:0	------------>	1000
N13:0	------------>	1200
N14:0	------------>	1400
N15:0	------------>	1600
N16:0	------------>	1800
N17:0	------------>	2000
N18:0	------------>	2200
N19:0	------------>	2400
N20:0	------------>	2600
N21:0	------------>	2800
N22:0	------------>	3000
N23:0	------------>	3200
N24:0	------------>	3400
N25:0	------------>	3600
N26:0	------------>	3800
N27:0	------------>	4000
N28:0	------------>	4200
N29:0	------------>	4400
N30:0	------------>	4600
N31:0	------------>	4800
N32:0	------------>	5000

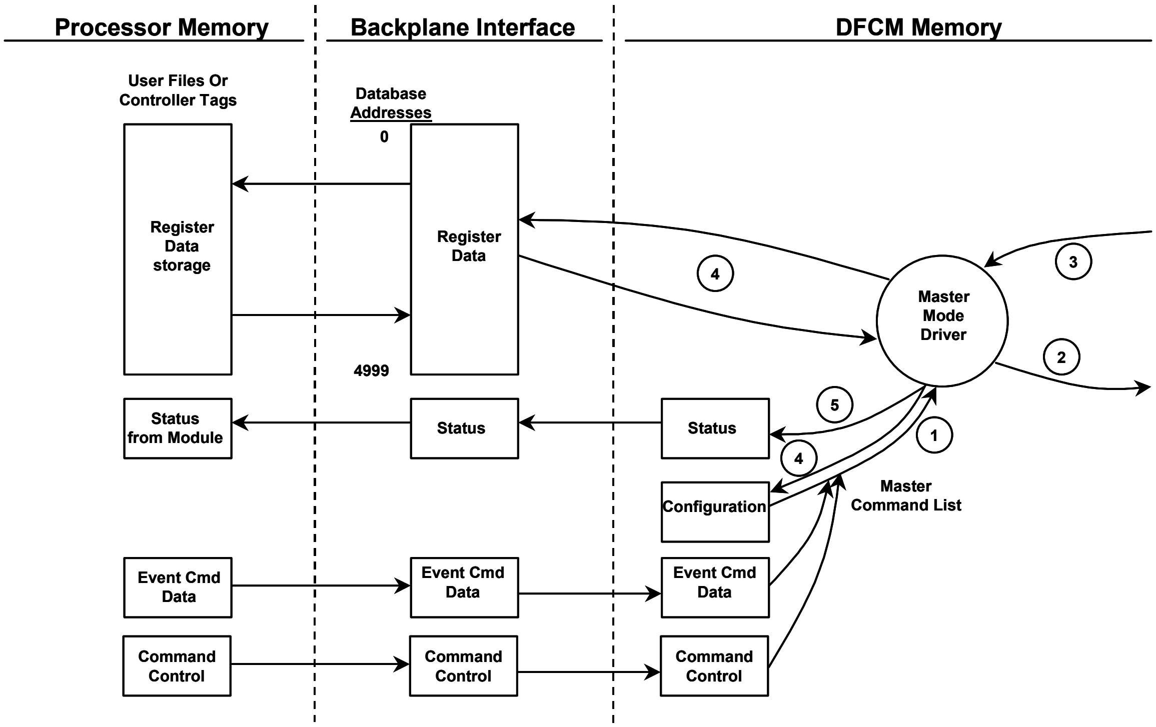
In order to retrieve data from the modules database register 200, the remote master would issue a command using the address N8:0. In order to interface with database base register 405, the remote master would use the address N9:5. The following table outlines the complete file emulation for the module:

Register Range	Content	Size
0 – 4999	User Data	5000
5000 – 5099	Backplane Configuration	10
5010 – 5039	Port 1 Setup	30
5040 – 5069	Port 2 Setup	30
5070 – 5199	Reserved	130
5200 – 6399	Port 1 Commands	1200
6400 – 7599	Port 2 Commands	1200
7600 – 7700	Misc. Status Data	200
7800 – 7999	Command Control	200
8000 – 9999	Reserved	2000

All the data in the module is available to a remote host. This permits the host device to remotely configure the module and view the status data.

2.5.2 Master Driver Mode

In the Master Mode of operation, the MVI69-DFCM module is responsible for issuing read or write commands to slave devices on the DF1 network. These commands are user configured in the module via the Master Command List received from the CompactLogix processor or issued directly from the CompactLogix processor (event command control). Command status is returned to the processor for each individual command in the command list status block. The location of this status block in the module's internal database is user defined. The following flow chart and associated table detail the flow of data into and out of the module.



Step	Description
1	The Master driver obtains configuration data from the internal Compact Flash disk. The configuration data obtained includes the number of commands and the Master Command List. These values are used by the Master driver to determine the type of commands to be issued to the other nodes on the DF1 network.
2	Once configured, the Master driver begins transmitting read and/or write commands to the other nodes on the network. If writing data to another node, the data for the write command is obtained from the module's internal database to build the command.
3	Presuming successful processing by the node specified in the command, a response message is received into the Master driver for processing.
4	Data received from the node on the network is passed into the module's internal database, assuming a read command.
5	Status is returned to the CompactLogix processor for each command in the Master Command List.

Refer to the appendix for a complete discussion of the structure and content of each command. Care must be taken in constructing each command in the list for predictable operation of the module. If two commands write to the same internal database address of the module, the results will not be as desired. All commands containing invalid data will be ignored by the module. The following table displays the functions supported by the module and the format of each command:

Module Information Data ← | → Device Information Data

DF1 COMMAND STRUCTURE

Column #	1	2	3	4	5	6	7	8	9	10	11
Function Code	**Enable Code**	**Internal Address**	**Poll Interval Time**	**Count**	**Swap Code**	**Node Address**	**Function Code**	**Function Parameters**			
FC 1	Code	Register	Seconds	Count	Code	Node	1	Word Address			
FC 2	Code	Register	Seconds	Count	Code	Node	2	Word Address			
FC 3	Code	Register	Seconds	Count	0	Node	3	Word Address			
FC 4	Code	Register	Seconds	Count	0	Node	4	Word Address			
FC 5	Code	Register	Seconds	Count	Code	Node	5	Word Address			
FC 100	Code	Register	Seconds	Count	Code	Node	100	File Number	Element	Sub-Element	
FC 101	Code	Register	Seconds	Count	Code	Node	101	File Number	Element	Sub-Element	
FC 102	Code	Register	Seconds	Count	0	Node	102	File Number	Element	Sub-Element	
FC 150	Code	Register	Seconds	Count	Code	Node	150	File String			
FC 151	Code	Register	Seconds	Count	Code	Node	151	File String			
FC 152	Code	Register	Seconds	Count	0	Node	152	File String			
FC 501	Code	Register	Seconds	Count	Code	Node	501	File Type	File Number	Element	
FC 502	Code	Register	Seconds	Count	Code	Node	502	File Type	File Number	Element	Sub-Element
FC 509	Code	Register	Seconds	Count	Code	Node	509	File Type	File Number	Element	
FC 510	Code	Register	Seconds	Count	Code	Node	510	File Type	File Number	Element	Sub-Element
FC 511	Code	Register	Seconds	Count	0	Node	511	File Type	File Number	Element	Sub-Element

Node Address = Destination Address for Message

3 Module Configuration

3.1 Power Up

On power up, the module enters into a logical loop waiting to receive configuration data from the processor. Upon receipt, the module will begin execution of the command list if it is present.

3.2 Configuration File

In order for the module to operate, a configuration file (DFCM.CFG) is required. This configuration file contains information to set the data transfer characteristics between the module and the processor, to configure the communication information, to establish the DF1 protocol parameters, and to define the databases required to hold the protocol data sets. Each parameter in the file must be set carefully in order for the application to be implemented successfully.

The following provides an example of a DFCM configuration file. Please refer to Appendix F for information on how to transfer the configuration file between the module and the PC.

```
# DFCM69_120.CFG
#
# This file contains the configuration for the MVI69-DFCM communication
# module.
#
# LOCATION      : Test Bench
# DATE          : 02/19/2004
# CONFIGURED BY : RAR
# MODIFIED      :
#
# This section is used to define the configuration for the Module level
# data.
#
[Module]
Module Name : Test Example of MVI69-DFCM Communication Module

Backplane Fail Count   :     0  #
Error/Status Pointer   :  2000  #Location for module status data (-1=ignore)

Block Transfer Size  :   120    #Data size for BTR/BTW 60, 120 or 240

Read Register Start  :     0    #Starting DB location where data read by processor
Read Register Count  :   360    #Number of words transferred to processor (BT size * n)
Write Register Start :  1000    #Starting DB location where data placed by processor
Write Register Count :   240    #Number of words transferred from processor (BT size * n)
```

```
# This section is used to define the configuration for the DF1 master device
# simulated on Port 1.
#

[DF1 Port 1]
Enabled                 : Yes    #Y=Use port, N=Do not use port
Type                    : Master #M=Master, S=Slave
Local Station ID        : 0      #DF1 node address
Protocol                : Full   #F=Full-Duplex, H=Half-Duplex
Termination Type        : CRC    #B=BCC, C=CRC
Baud Rate               : 19200  #Baud rate for port 110-115K
Parity                  : None   #N=None,O=Odd,E=Even,M=Mark,S=Space
Data Bits               : 8      #5, 6, 7 or 8
Stop Bits               : 1      #1 or 2
Minimum Response Delay  : 0      #0-65535 mSec before sending response msg
RTS On                  : 0      #0-65536 mSec before message
RTS Off                 : 1      #0-65536 mSec after message
Use CTS Line            : No     #Use CTS modem control line (Y/N)
Response Timeout        : 15000  #Response messgage timeout (0-65535 mSec)
Retry Count             : 2      #Response failure retry count

ENQ Delay               : 0      #0-65535 mSec before DLE-ENQ sent
Minimum Command Delay   : 10     #Minimum number of msec's between commands
Error Delay Count       : 100    #0-65535 Command cycle count if error
Command Error Pointer   : 3000   #Cmd Error list data (-1=ignore)
Slave List Pointer      : 3100   #Slave status list data (-1=ignore)

First File              : 7      #First file number for SLC simulation
File Size               : 200    #Number of elements in each file
File Offset             : 0      #Database offset for first file element


[DF1 Port 1 Commands]
# The file contains examples for a SLC 5/03 processor.
#
# LOCATION      :
# DATE          : 06/24/99
# CONFIGURED BY : RAR
# MODIFIED      :
#   07/23/99 -- Set to read more data file types.
#
START
#      1       2       3      4    5        6    7    8    9   10   11
#        Internal     Poll       Swap     Node Func File File  Elm  Sub
# Enable  Address Interval Count Code  Address Code Type    #    #  Elm
```

```
       1       10        0    10    0        1  501    N    7    0
       1     1500        0    10    0        1  502    N    7    0    0
       1       10        0    10    0        1  509    N    7   10
END

[DF1 Port 1 OVERRIDE DATA FILE MAPS]
#      DB     File     First     Word
# Address   Number   Element   Length
START
END



# This section is used to define the configuration for the DF1 slave device
# simulated on Port 2.
#

[DF1 Port 2]
Enabled                 : Yes    #Y=Use port, N=Do not use port
Type                    : Slave  #M=Master, S=Slave
Local Station ID        : 1      #DF1 node address
Protocol                : FULL   #F=Full-Duplex, H=Half-Duplex
Termination Type        : CRC    #B=BCC, C=CRC
Baud Rate               : 19200  #Baud rate for port 110-115K
Parity                  : None   #N=None,O=Odd,E=Even,M=Mark,S=Space
Data Bits               : 8      #5, 6, 7 or 8
Stop Bits               : 1      #1 or 2
Minimum Response Delay  : 0      #0-65535 mSec before sending response msg
RTS On                  : 0      #0-65536 mSec before message
RTS Off                 : 1      #0-65536 mSec after message
Use CTS Line            : No     #Use CTS modem control line (Y/N)
Response Timeout        : 1000   #Response messgage timeout (0-65535 mSec)
Retry Count             : 2      #Response failure retry count

ENQ Delay               : 0      #0-65535 mSec before DLE-ENQ sent
Minimum Command Delay   : 0      #Minimum number of msec's between commands
Error Delay Count       : 100    #0-65535 Command cycle count if error
Command Error Pointer   : -1     #Cmd Error list data (-1=ignore)
Slave List Pointer      : -1     #Slave status list data (-1=ignore)

First File              : 7      #First file number for SLC simulation
File Size               : 200    #Number of elements in each file
File Offset             : 0      #Database offset for first file element


[DF1 Port 2 Commands]
# The file contains examples for a SLC 5/03 processor.
```

```
#
# LOCATION      :
# DATE          : 06/24/99
# CONFIGURED BY : RAR
# MODIFIED      :
#   07/23/99 -- Set to read more data file types.
#
START
#      1       2       3      4    5        6    7    8    9   10   11
#        Internal     Poll       Swap     Node Func File File  Elm  Sub
# Enable  Address Interval Count Code  Address Code Type    #    #  Elm
END

[DF1 Port 2 OVERRIDE DATA FILE MAPS]
#      DB     File     First     Word
# Address   Number   Element   Length
START
     3500      200         0      100
     3600      230         0      200
END
```

The text file is separated into 5 sections with topic header names enclosed in the **[ ]** characters. The sections present in the file are as follows:

[Section]	**Description**
[Module]	Used to define the configuration for module-level data
[DF1 Port x]	Used to define the configuration for the DF1 master device simulated on Port x.
DF1 Port x Commands	Used to define the commands on the specified port
DF1 Port x Override Data File Maps	Used to override the slave default mapping in specific database ranges

After each section header, the file contains a set of parameters. Unique labels are used under each section to specify a parameter. Each label in the file must be entered exactly as shown in the file for the parameter to be identified by the program. If the module is not considering a parameter, check the label for the data item. Each parameter's value is separated from the label with the '**:**' character. This character is used by the program to delimit the position in the data record where to start reading data. All data for a parameter must be placed after the '**:**' character. For numeric parameter values, any text located after the value will not be used. There must be at least one space character between the end of the parameter value and the following text. The following example shows a parameter entry:

RTS On   : 6   #Set RTS On delay value from 0 to 65535 milliseconds

The parameter label is "RTS On" and the parameter value is 6. The characters after the parameter value are ignored and are used for internal documentation of the configuration file.

Any record that begins with the '**#**' character is considered to be a comment record. These records can be placed anywhere in the file as long as the '**#**' character is found in the first column of the line. These lines are ignored in the file and can be used to provide documentation within the configuration file. Liberal use of comments within the file can ease the use and interpretation of the data in the file.

Sections of the configuration file that contain lists of data are formatted differently. Each list begins with the label **START** and ends when the **END** label is reached. When entering the list data, make certain that the first character in each line is left blank.

Refer to Appendix C for a description of configuration file parameters.

Changing parameters during operation
A copy of the module's configuration data is mapped in the module's database as displayed in the following table. These values are initialized when the module first receives its configuration from the configuration file.

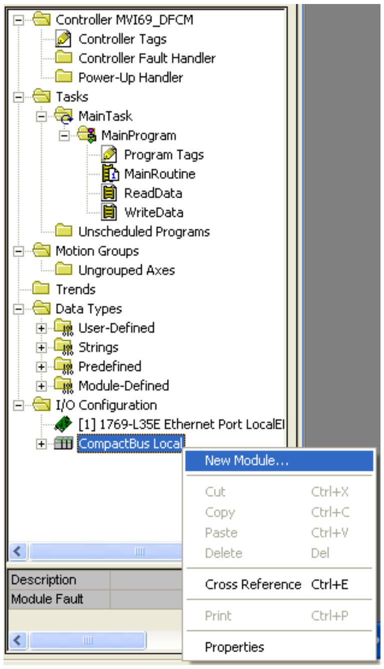
Module Register Address	Functional Modes Affected	Name	Description
5000-5009	Data Transfer	General Module Configuration	This section of the configuration data contains the module configuration data that defines the data transfer between the module and the CompactLogix processor.
5010-5039 and 5040-5069	Master and Slave	Port Configuration	These sections are used to define the characteristics of each of the DF1 serial communication ports on the module. These parameters must be set correctly for proper module operation.
5200-6399 and 6400-7599	Master	Master Command List	If the module's Master Mode functionality is to be supported on a port, the Master Command List must be set up.

The configuration file is located in the module as well as on the CD and website. With a new module, ProSoft recommends that you download the configuration file from the module for editing. Refer to Appendix F for information on uploading and downloading the configuration file.

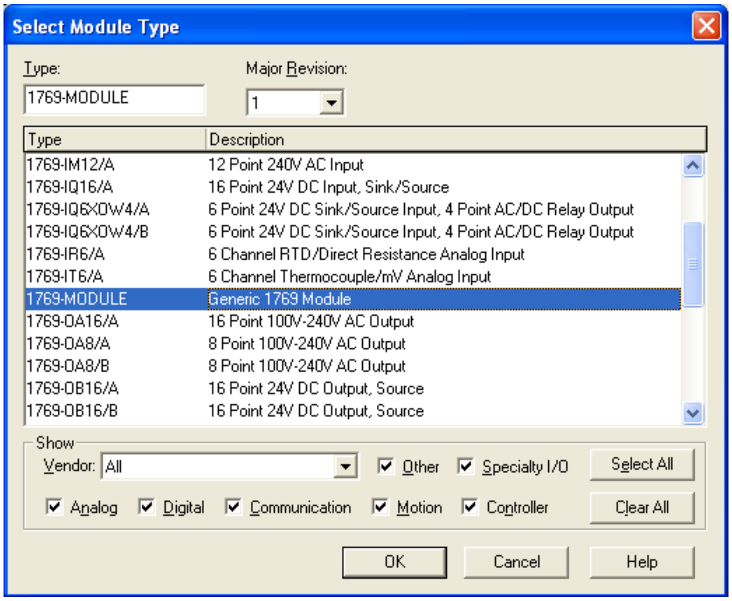
3.3 Setting Up the Module

Set up of the MVI69-DFCM module only requires software configuration using the RSLogix 5000 program. The easiest method to implement the module is to start with the example provided with the module (MVI69DFCM.ACD). If you are installing this module in an existing application, you can simply copy the elements required from the example ladder logic to your application. NOTE: The module can only be added to a project using the software in offline mode.

The first step in setting up the module is to define the module to the system. Right-click the mouse button on the I/O Configuration option in the Controller Organization window to display a pop-up menu. Select the New Module… option from the I/O Configuration menu.



This will cause the program to display the following dialog box.


Select Module Type

Type: 1769-MODULE

Major Revision: 1

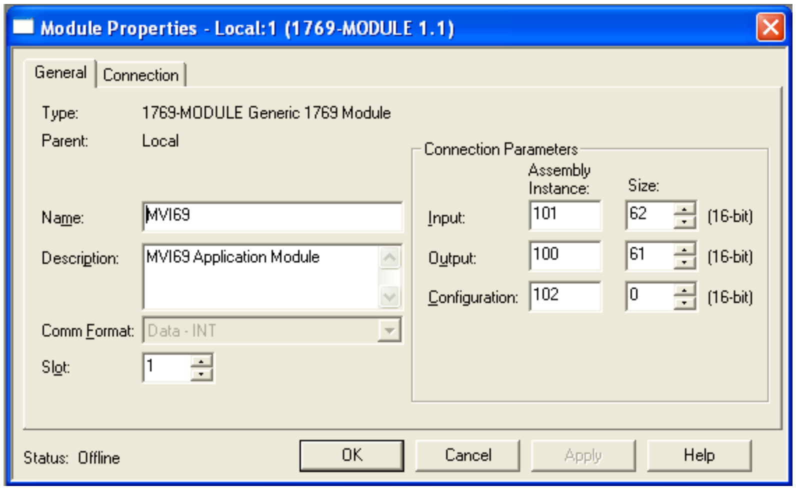
Type	Description
1769-IM12/A	12 Point 240V AC Input
1769-IQ16/A	16 Point 24V DC Input, Sink/Source
1769-IQ6XOW4/A	6 Point 24V DC Sink/Source Input, 4 Point AC/DC Relay Output
1769-IQ6XOW4/B	6 Point 24V DC Sink/Source Input, 4 Point AC/DC Relay Output
1769-IR6/A	6 Channel RTD/Direct Resistance Analog Input
1769-IT6/A	6 Channel Thermocouple/mV Analog Input
1769-MODULE	Generic 1769 Module
1769-OA16/A	16 Point 100V-240V AC Output
1769-OA8/A	8 Point 100V-240V AC Output
1769-OA8/B	8 Point 100V-240V AC Output
1769-OB16/A	16 Point 24V DC Output, Source
1769-OB16/B	16 Point 24V DC Output, Source

Show
Vendor: All ☑ Other ☑ Specialty I/O
☑ Analog ☑ Digital ☑ Communication ☑ Motion ☑ Controller

Select the 1756-Module (Generic 1756 Module) from the list and select the OK button.

You should configure the Connection Parameters according to the Block Transfer Size parameter in the configuration file as follows:

Block Transfer Size = 60



Module Properties - Local:1 (1769-MODULE 1.1)

General | Connection

Type: 1769-MODULE Generic 1769 Module

Parent: Local

Name: MVI69

Description: MVI69 Application Module

Comm Format: Data - INT

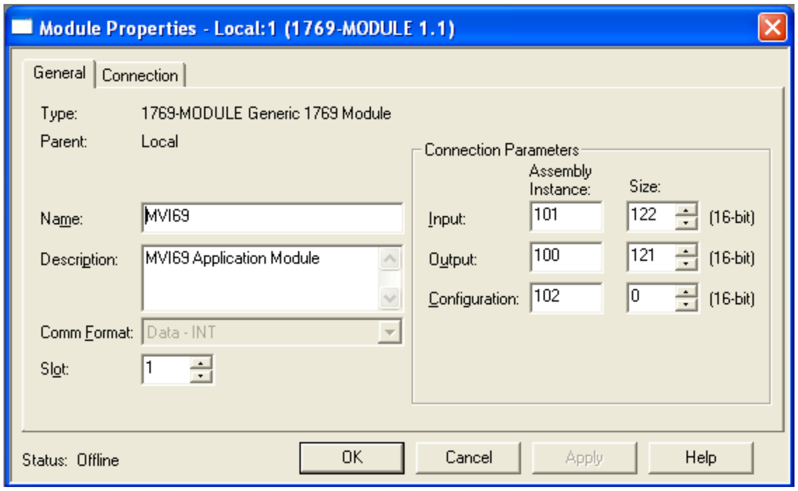
Slot: 1

Connection Parameters

	Assembly Instance:	Size:	
Input:	101	62	(16-bit)
Output:	100	61	(16-bit)
Configuration:	102	0	(16-bit)

Status: Offline

Block Transfer Size = 120



Module Properties - Local:1 (1769-MODULE 1.1)

General | Connection

Type: 1769-MODULE Generic 1769 Module

Parent: Local

Name: MVI69

Description: MVI69 Application Module

Comm Format: Data - INT

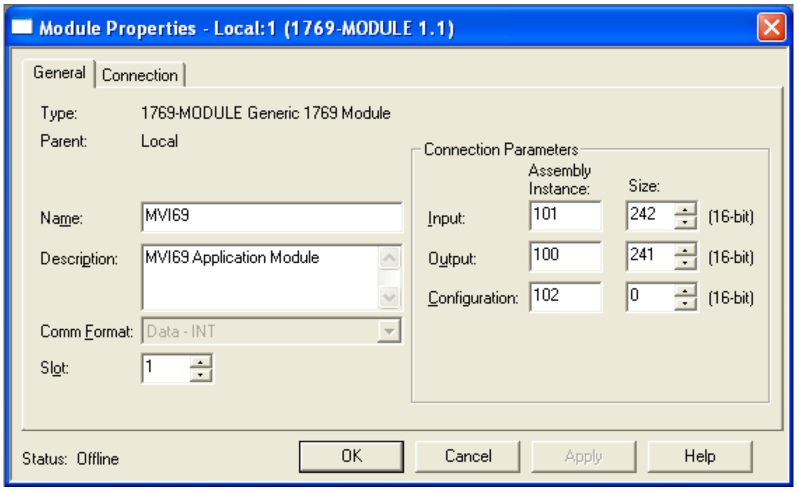
Slot: 1

Connection Parameters

	Assembly Instance:	Size:	
Input:	101	122	(16-bit)
Output:	100	121	(16-bit)
Configuration:	102	0	(16-bit)

Status: Offline

Block Transfer Size = 240



Module Properties - Local:1 (1769-MODULE 1.1)

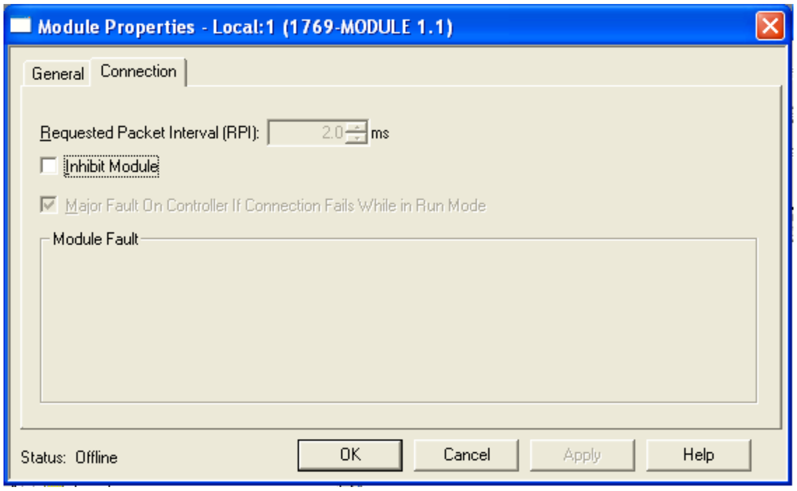
Type: 1769-MODULE Generic 1769 Module
Parent: Local
Name: MVI69
Description: MVI69 Application Module
Comm Format: Data - INT
Slot: 1

Connection Parameters

	Assembly Instance:	Size:	
Input:	101	242	(16-bit)
Output:	100	241	(16-bit)
Configuration:	102	0	(16-bit)

Status: Offline

Fill in the dialog boxes as shown adjusting the Name, Description and Slot options for your application. Be certain to select the **Comm Format** as **Data - INT** in the dialog box. Failure to set the **Assembly Instance** and **Size** values correctly will result in a module that will not communicate over the backplane of the CompactLogix rack. Select the Next command button to display the next dialog box.



Module Properties - Local:1 (1769-MODULE 1.1)

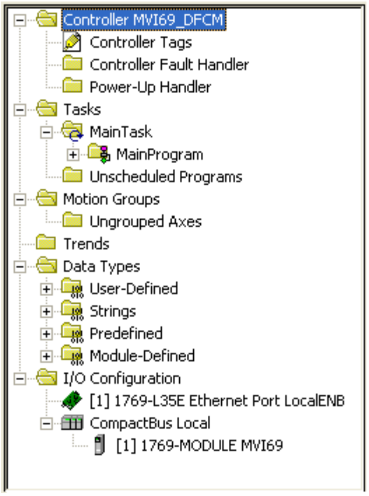
Requested Packet Interval (RPI): 2.0 ms
□ Inhibit Module
☑ Major Fault On Controller If Connection Fails While in Run Mode

Module Fault

Status: Offline

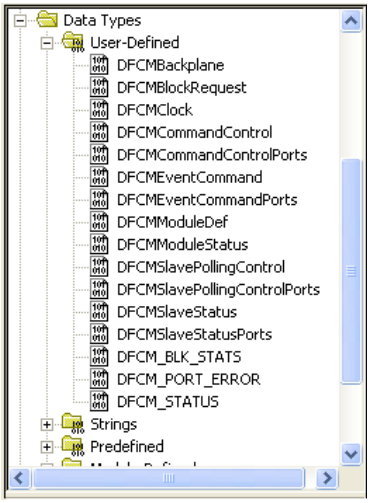
Select the Request Packet Interval value for scanning the I/O on the module. This value represents the minimum frequency the module will handle scheduled events. This value should not be set to less than 1 millisecond. Values between 1 and 10 milliseconds should work with most applications.

After completing the module setup, the Controller Organization window will display the module's presence. The data required for the module will be defined to the application, and objects will be allocated in the Controller Tags data area. An example of the Controller Organization window follows.



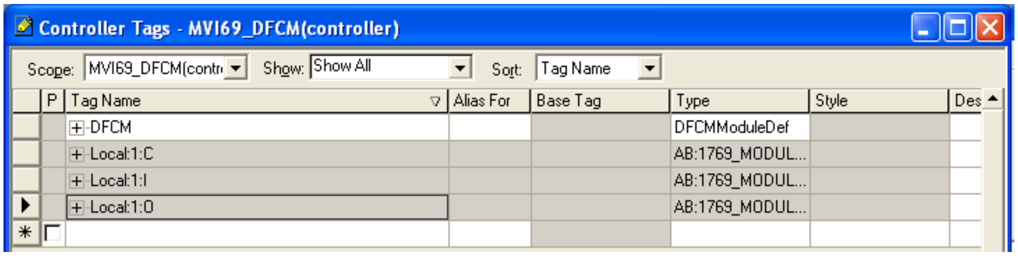
- Controller MVI69_DFCM
  - Controller Tags
  - Controller Fault Handler
  - Power-Up Handler
- Tasks
  - MainTask
    - MainProgram
  - Unscheduled Programs
- Motion Groups
  - Ungrouped Axes
- Trends
- Data Types
  - User-Defined
  - Strings
  - Predefined
  - Module-Defined
- I/O Configuration
  - [1] 1769-L35E Ethernet Port LocalENB
  - CompactBus Local
    - [1] 1769-MODULE MVI69

The next step in the module's setup is to define the User Defined Data Types to be used with the module. Copy these data types from the example ladder logic if you are not using the example. They will be defined if you are starting from the example ladder logic. The Controller Organization window should display the User Defined Data Types shown below:



- Data Types
  - User-Defined
    - DFCMBackplane
    - DFCMBlockRequest
    - DFCMClock
    - DFCMCommandControl
    - DFCMCommandControlPorts
    - DFCMEventCommand
    - DFCMEventCommandPorts
    - DFCMModuleDef
    - DFCMModuleStatus
    - DFCMSlavePollingControl
    - DFCMSlavePollingControlPorts
    - DFCMSlaveStatus
    - DFCMSlaveStatusPorts
    - DFCM_BLK_STATS
    - DFCM_PORT_ERROR
    - DFCM_STATUS
  - Strings
  - Predefined

The next step in module setup is to define the data to be used to interface with the module and the ladder logic. Open the Controller Tags Edit Tags dialog box and enter the values shown in the following example. The MVI69-DFCM module is defined in the example as DFCM1. You can set the tag name to any valid tag name you desire. If you are using the example ladder logic, this step has already been performed.



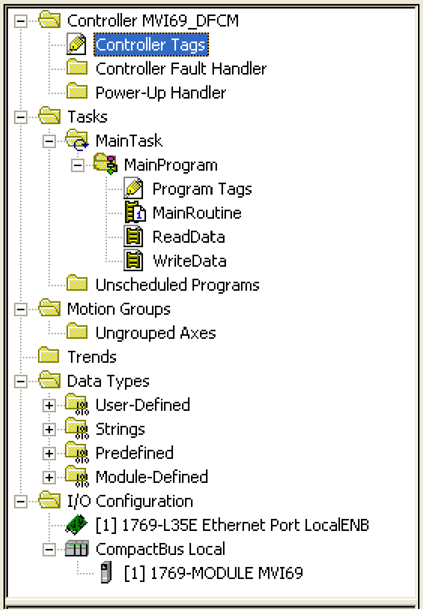
Controller Tags - MVI69_DFCM(controller)

Scope: MVI69_DFCM(contr Show: Show All Sort: Tag Name

P	Tag Name	Alias For	Base Tag	Type	Style	Des
	+ DFCM			DFCMModuleDef		
	+ Local:1:C			AB:1769_MODUL...		
	+ Local:1:I			AB:1769_MODUL...		
	+ Local:1:O			AB:1769_MODUL...		
□						

At this point, take the time to fill in the configuration values in the DFCM1 data table and adjust array sizes. Refer to the Module Data Object section of this document for information on configuring the module.

The last step in the module setup is to add the ladder logic. If you are using the example ladder logic, adjust the ladder to fit your application. If you are not using the ladder example, copy the ladder logic shown in the Controller Organization window below to your application.

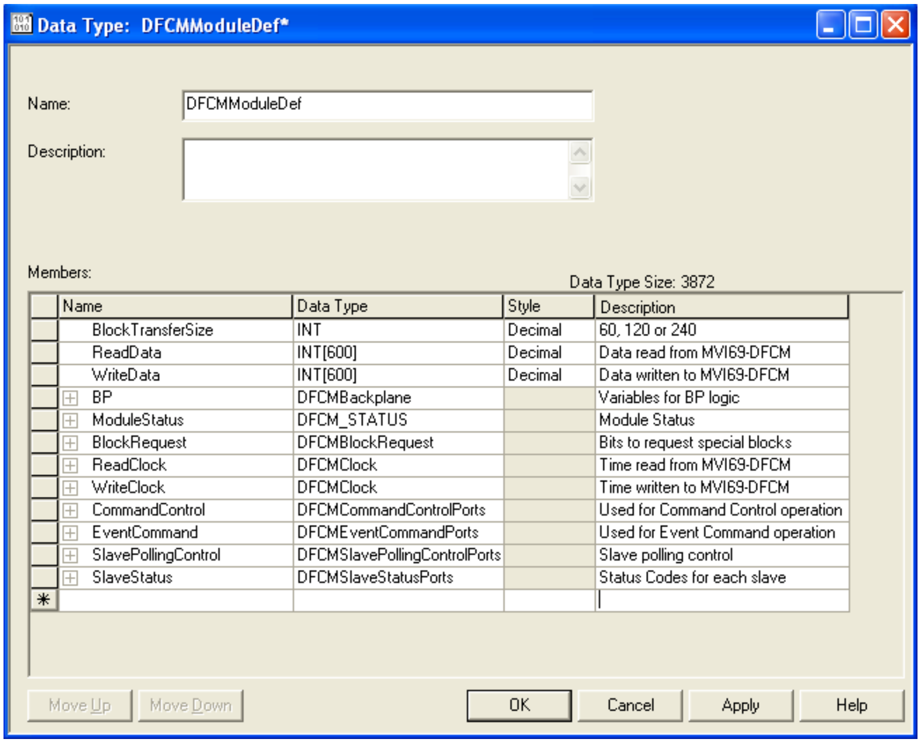


```
Controller MVI69_DFCM
    Controller Tags
    Controller Fault Handler
    Power-Up Handler
Tasks
    MainTask
        MainProgram
            Program Tags
            MainRoutine
            ReadData
            WriteData
    Unscheduled Programs
Motion Groups
    Ungrouped Axes
Trends
Data Types
    User-Defined
    Strings
    Predefined
    Module-Defined
I/O Configuration
    [1] 1769-L35E Ethernet Port LocalENB
    CompactBus Local
        [1] 1769-MODULE MVI69
```

The module is now set up and ready to be used with your application. Insert the module in the rack and attach the DF1 serial communication cables. Download the new application to the controller and place the processor in run mode. If all the configuration parameters are set correctly and the module is attached to a DF1 network, the module's Application LED (APP LED) should remain on and the backplane activity LED (BP ACT) should blink very rapidly. Refer to the **Diagnostics and Troubleshooting** section of the if you encounter errors. Attach a computer or terminal to Port 1 on the module and check the status of the module using the resident debugger in the module. Refer to the **Diagnostics and Troubleshooting** section for a complete discussion of the use of this feature.

3.3.1 Module Data Object (DFCMModuleDef)

All data related to the MVI69-DFCM is stored in a user defined data type. An instance of the data type is required before the module can be used. This is done by simply declaring a variable of the data type in the Controller Tags Edit Tags dialog box. The structure of the object is displayed in the figure below:



Name: DFCMModuleDef

Description:

Members:

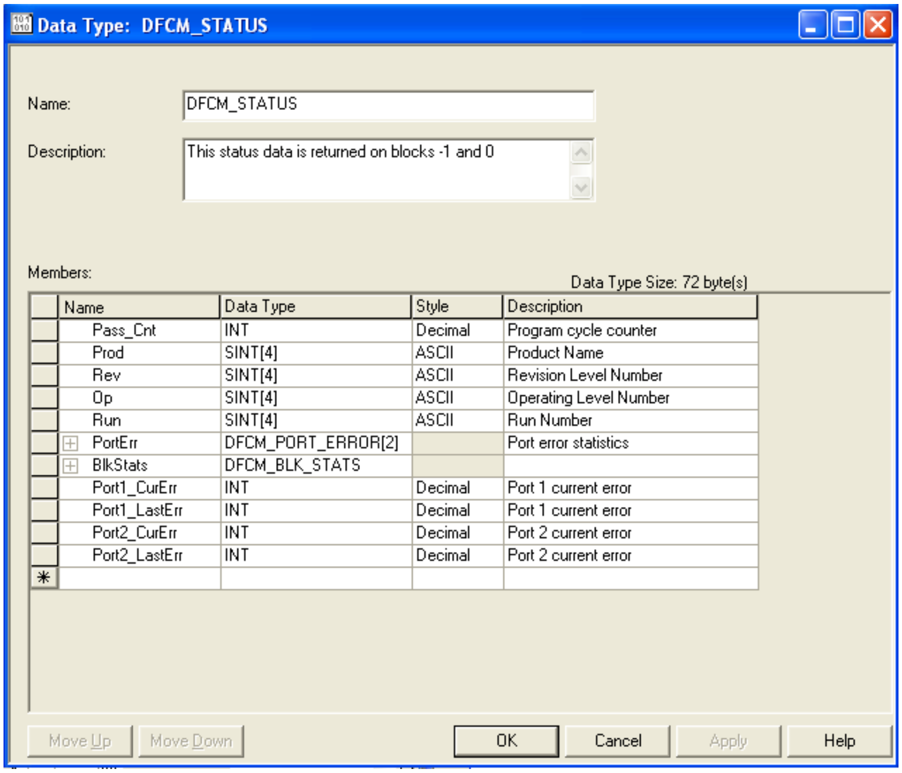
Data Type Size: 3872

Name	Data Type	Style	Description
BlockTransferSize	INT	Decimal	60, 120 or 240
ReadData	INT[600]	Decimal	Data read from MVI69-DFCM
WriteData	INT[600]	Decimal	Data written to MVI69-DFCM
⊞ BP	DFCMBackplane		Variables for BP logic
⊞ ModuleStatus	DFCM_STATUS		Module Status
⊞ BlockRequest	DFCMBlockRequest		Bits to request special blocks
⊞ ReadClock	DFCMClock		Time read from MVI69-DFCM
⊞ WriteClock	DFCMClock		Time written to MVI69-DFCM
⊞ CommandControl	DFCMCommandControlPorts		Used for Command Control operation
⊞ EventCommand	DFCMEventCommandPorts		Used for Event Command operation
⊞ SlavePollingControl	DFCMSlavePollingControlPorts		Slave polling control
⊞ SlaveStatus	DFCMSlaveStatusPorts		Status Codes for each slave

This object contains objects that define the configuration, user data, status and command control data related to the module. Each of these object types is discussed in the following sections of the document.

3.4 Status Object (DFCM_STATUS)

This object is used to view the status of the module. The **DFCM_STATUS** object shown below is updated each time a read block is received by the processor. This data can be used to monitor the state of the module at a "real-time rate".



Name: DFCM_STATUS

Description: This status data is returned on blocks -1 and 0

Members:

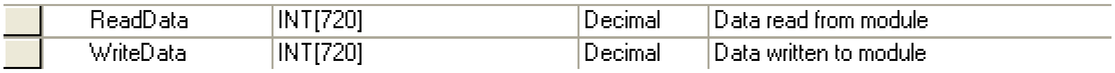
Data Type Size: 72 byte(s)

	Name	Data Type	Style	Description
	Pass_Cnt	INT	Decimal	Program cycle counter
	Prod	SINT[4]	ASCII	Product Name
	Rev	SINT[4]	ASCII	Revision Level Number
	Op	SINT[4]	ASCII	Operating Level Number
	Run	SINT[4]	ASCII	Run Number
	⊞ PortErr	DFCM_PORT_ERROR[2]		Port error statistics
	⊞ BlkStats	DFCM_BLK_STATS		
	Port1_CurErr	INT	Decimal	Port 1 current error
	Port1_LastErr	INT	Decimal	Port 1 current error
	Port2_CurErr	INT	Decimal	Port 2 current error
	Port2_LastErr	INT	Decimal	Port 2 current error
*				

Refer to Appendix B for a complete listing of the data stored in this object.

3.5 User Data Objects

These objects are used to hold data to be transferred between the processor and the MVI69-DFCM module. The user data is the read and write data transferred between the processor and the module as "pages" of data up to 60, 120, or 240 words long depending on the Block Transfer Size parameter.



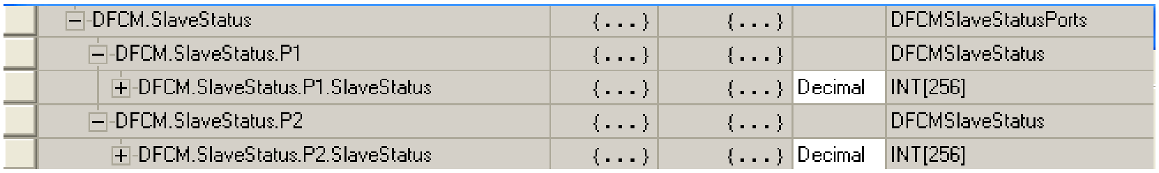
	ReadData	INT[720]	Decimal	Data read from module
	WriteData	INT[720]	Decimal	Data written to module

The read data array should be dimensioned according to the Read Data Count parameter in the configuration file. The ReadData task is responsible for placing the data received into the proper position in the read data array. This data can be used for status and control in the ladder logic of the processor.

The write data array should be dimensioned according to the Read Data Count parameter in the configuration file. . The WriteData task is responsible for placing the write data into the output image for transfer to the module.

3.6 Slave Polling Control and Status

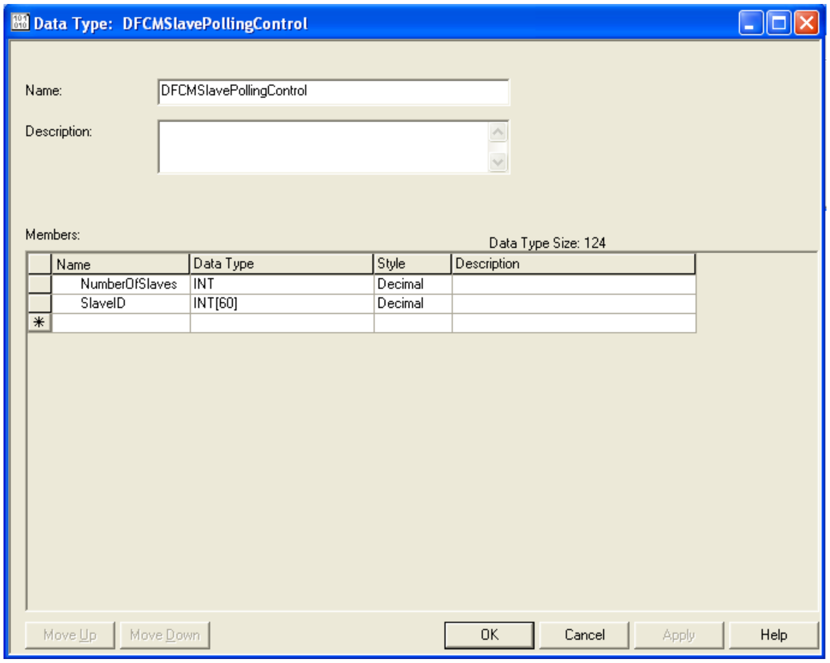
Two arrays are allocated in the processor to hold the polling status of each slave on the master ports. This status data can be used to determine which slaves are currently active on the port, are in communication error or have their polling suspended and disabled. Ladder logic in the processor can be written to monitor and control the status of each slave on a master port. The objects used are displayed below:



− DFCM.SlaveStatus	{...}	{...}		DFCMSlaveStatusPorts
− DFCM.SlaveStatus.P1	{...}	{...}		DFCMSlaveStatus
+ DFCM.SlaveStatus.P1.SlaveStatus	{...}	{...}	Decimal	INT[256]
− DFCM.SlaveStatus.P2	{...}	{...}		DFCMSlaveStatus
+ DFCM.SlaveStatus.P2.SlaveStatus	{...}	{...}	Decimal	INT[256]

3.7 DFCM Slave Polling Control (DFCMSlavePollingControl)

This user-defined data type is used to send the Enable/Disable blocks to control the slave polling with blocks 3000, 3001, 3100 or 3101.



Data Type: DFCMSlavePollingControl

Name: DFCMSlavePollingControl

Description:

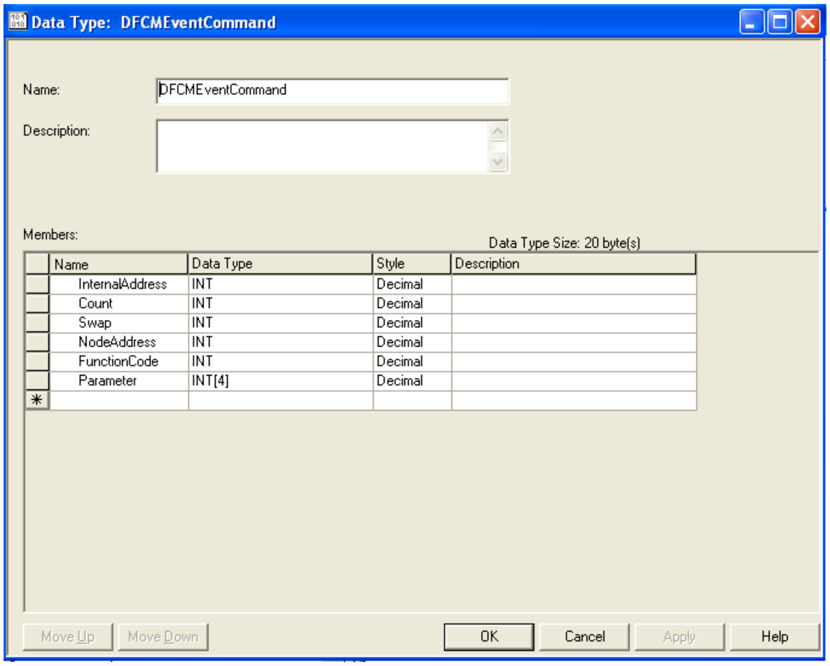
Members:

Data Type Size: 124

Name	Data Type	Style	Description
NumberOfSlaves	INT	Decimal	
SlaveID	INT[60]	Decimal	
*			

3.8 Event Command (DFCMEventCommand)

This data type is used to issue event commands to the modules using blocks 1000 and 2000.



Name: DFCMEventCommand

Description:

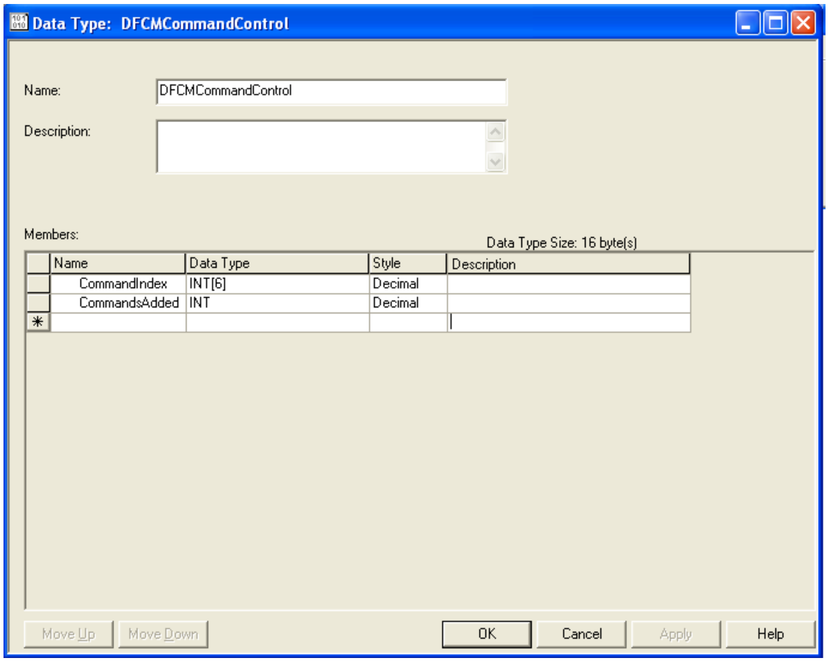
Members:

Data Type Size: 20 byte(s)

Name	Data Type	Style	Description
InternalAddress	INT	Decimal	
Count	INT	Decimal	
Swap	INT	Decimal	
NodeAddress	INT	Decimal	
FunctionCode	INT	Decimal	
Parameter	INT[4]	Decimal	

3.9 Command Control (DFCMCommandControl)

This data type is used to issue command control commands to the module using blocks 5000 to 5006 or 5100 to 5106.



Data Type: DFCMCommandControl

Name: DFCMCommandControl

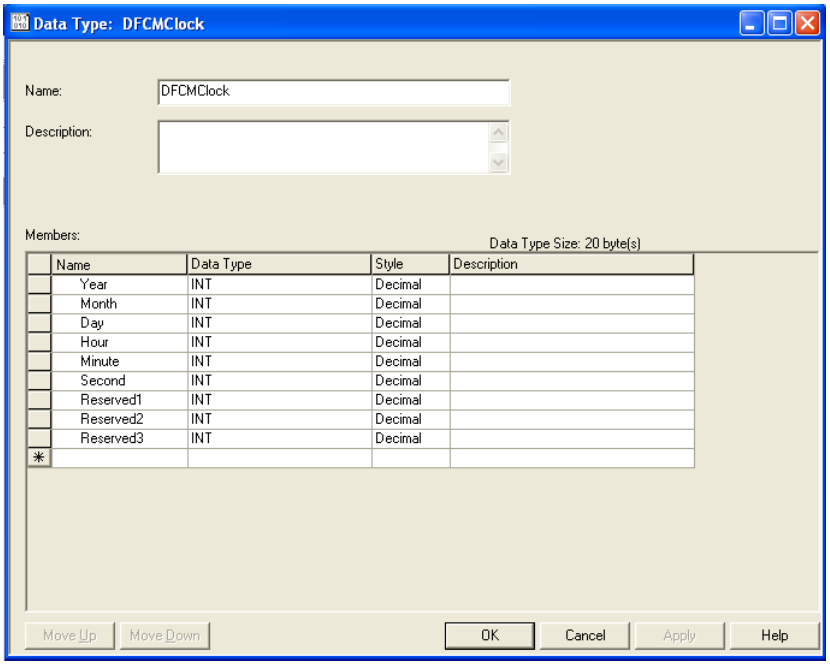
Description:

Members: Data Type Size: 16 byte(s)

Name	Data Type	Style	Description
CommandIndex	INT[6]	Decimal	
CommandsAdded	INT	Decimal	

3.10 Clock (DFCMClock)

This data type is used to issue clock commands.



Data Type: DFCMClock

Name: DFCMClock

Description:

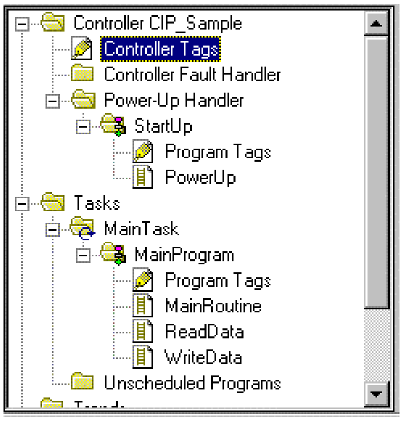
Members: Data Type Size: 20 byte(s)

Name	Data Type	Style	Description
Year	INT	Decimal	
Month	INT	Decimal	
Day	INT	Decimal	
Hour	INT	Decimal	
Minute	INT	Decimal	
Second	INT	Decimal	
Reserved1	INT	Decimal	
Reserved2	INT	Decimal	
Reserved3	INT	Decimal	

4 Ladder Logic

Ladder logic is required for application of the MVI69-DFCM module. Tasks that must be handled by the ladder logic are module configuration, data transfer, special block handling and status data receipt. This section discusses each aspect of the ladder logic as required by the module. Additionally, a power-up handler should be written to handle the initialization of the module's data and to clear any processor fault conditions.

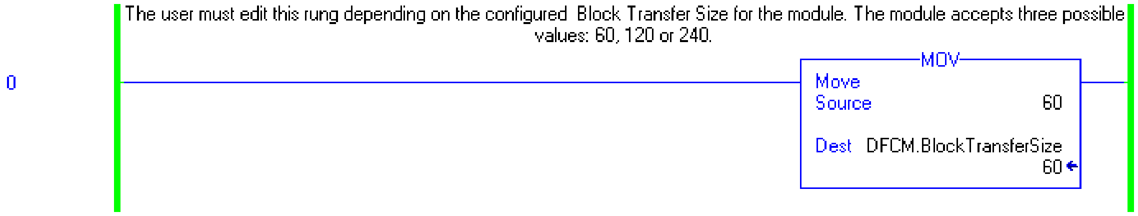
The Controller Organization window for the example ladder logic for the MVI69-DFCM module is shown below.



```
Controller CIP_Sample
    Controller Tags
    Controller Fault Handler
    Power-Up Handler
        StartUp
            Program Tags
            PowerUp
Tasks
    MainTask
        MainProgram
            Program Tags
            MainRoutine
            ReadData
            WriteData
    Unscheduled Programs
```

4.1 MainRoutine

The first rung copies the block transfer size value to be used in the ladder logic. This value (60, 120, or 240) should match the "Block Transfer Size" parameter in the configuration file.

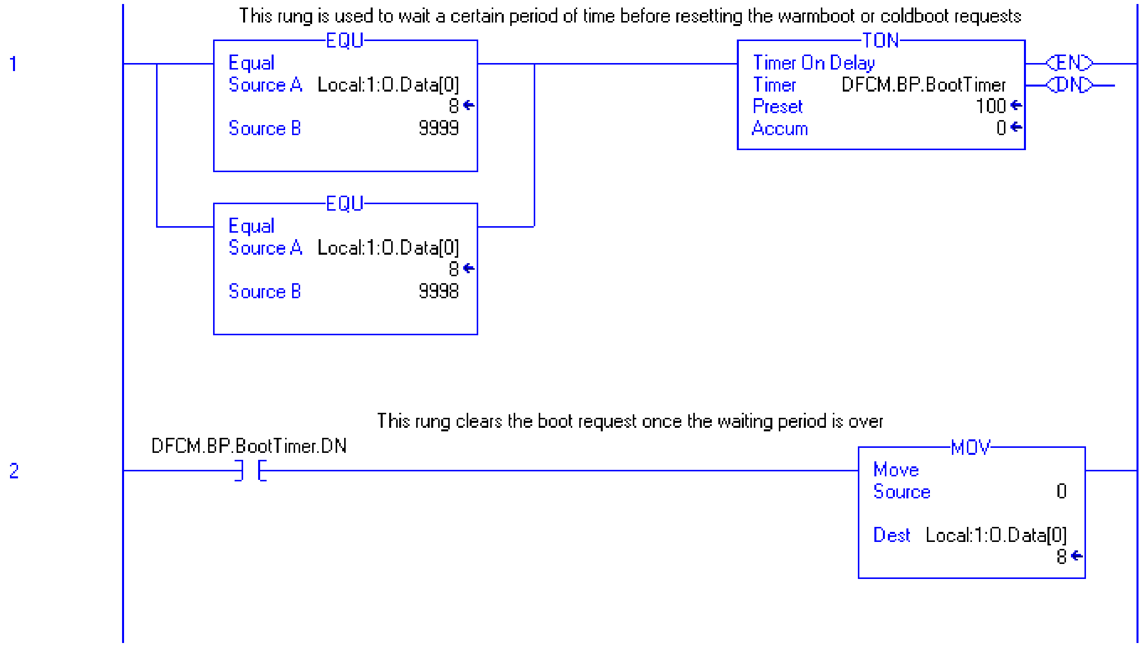


0

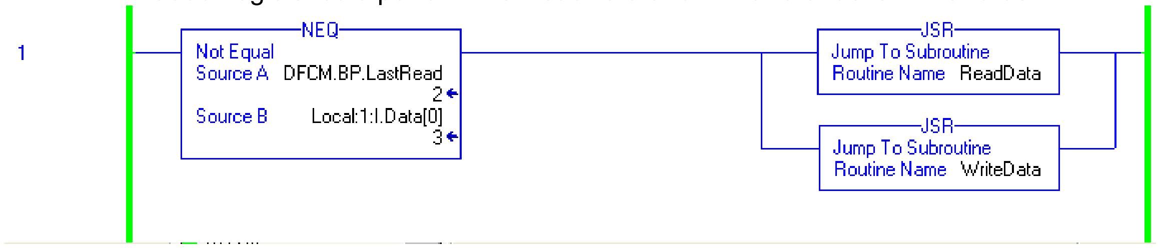
The user must edit this rung depending on the configured Block Transfer Size for the module. The module accepts three possible values: 60, 120 or 240.

MOV
Move
Source 60
Dest DFCM.BlockTransferSize
60

The following routine is used to initialize the ladder logic after a boot request:

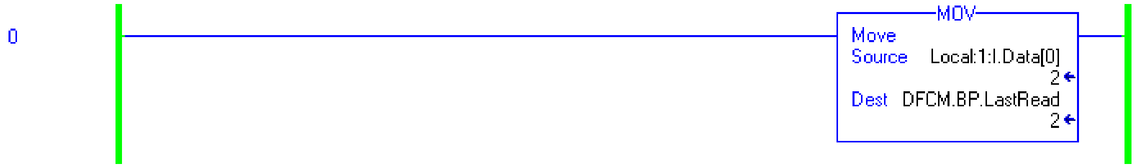

This rung is used to wait a certain period of time before resetting the warmboot or coldboot requests
1
EQU
Equal
Source A Local:1:O.Data[0]
8
Source B 9999
EQU
Equal
Source A Local:1:O.Data[0]
8
Source B 9998
TON
Timer On Delay
Timer DFCM.BP.BootTimer
Preset 100
Accum 0
EN
DN
This rung clears the boot request once the waiting period is over
2
DFCM.BP.BootTimer.DN
MOV
Move
Source 0
Dest Local:1:O.Data[0]
8

The MainRoutine is used to recognize the presence of new read data from the module for the processor. The module will cycle through its list of read blocks to transfer data from the module to the processor. Whenever new data is available, the module will set the value for the block in the module's input image (**Local:1:I:Data[249]**). The ladder logic must constantly scan this input word for a new value. When a new value is present, the ladder logic should perform the ReadData and WriteData tasks in that order.

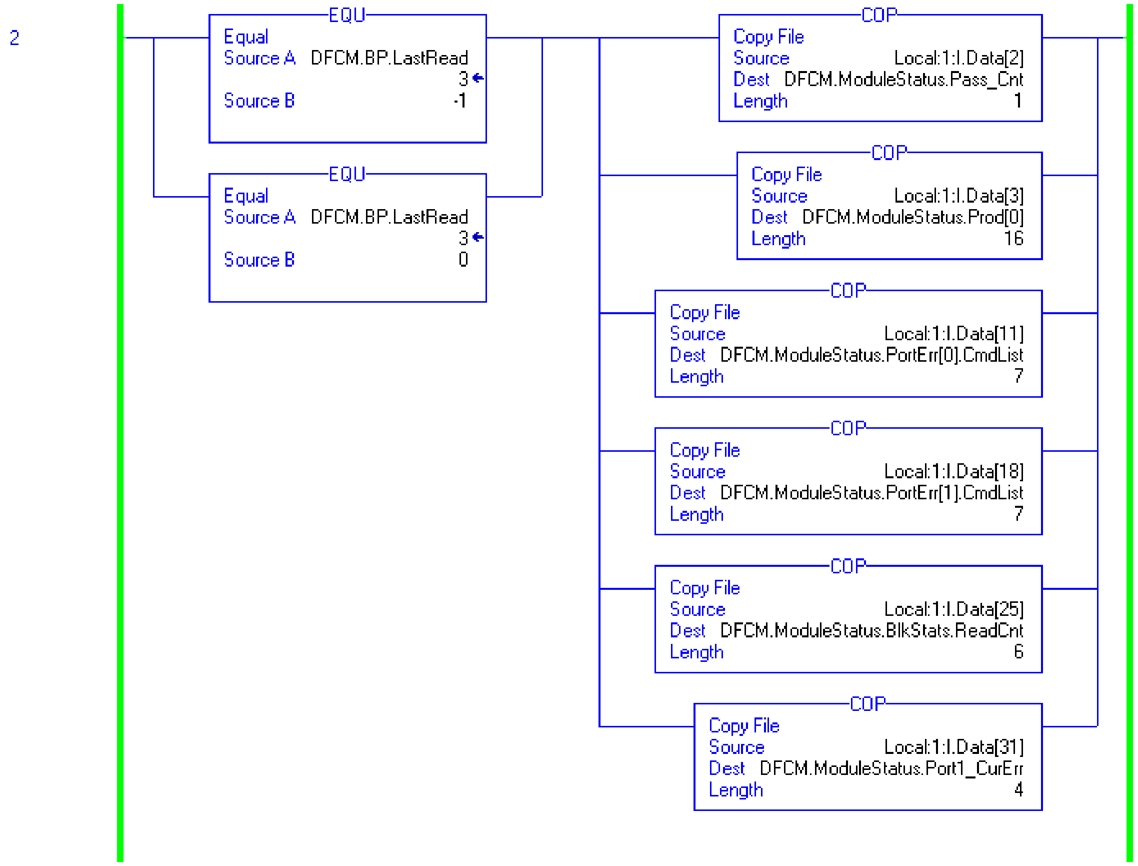


4.2 ReadData

The ReadData task is responsible for handling all new data received from the module and placing it in the proper location in the processor. Data is transferred from the module to the processor using the module's input image (**Local:1:I:Data[]**). The first rung of the task sets the last read block number (**DFCM1.BP.LastRead**) from the current block number sent from the module (**Local:1:I:Data[0]**).

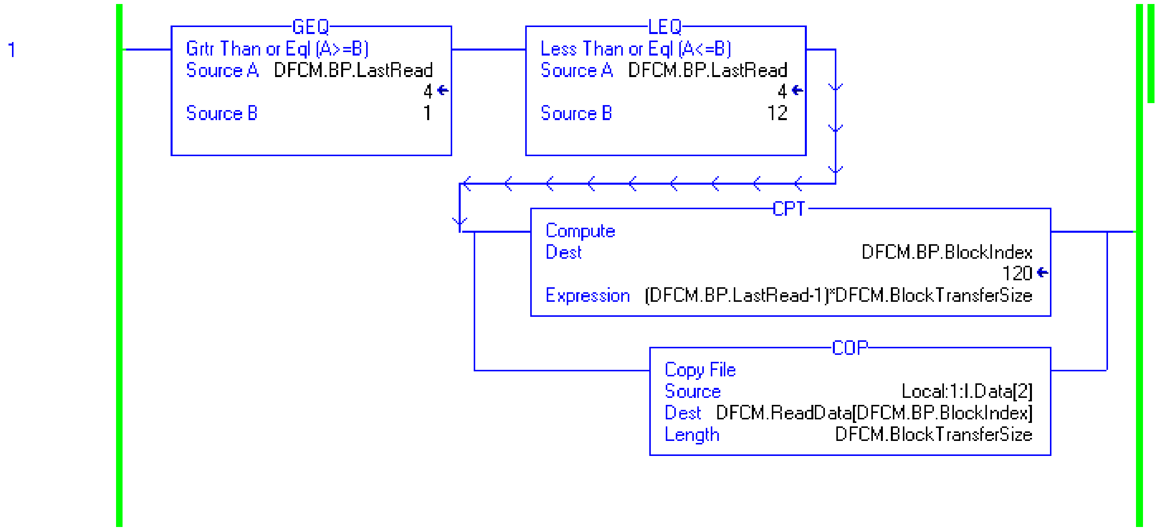


The module sends all the status data in blocks with identification codes of 0 and -1:



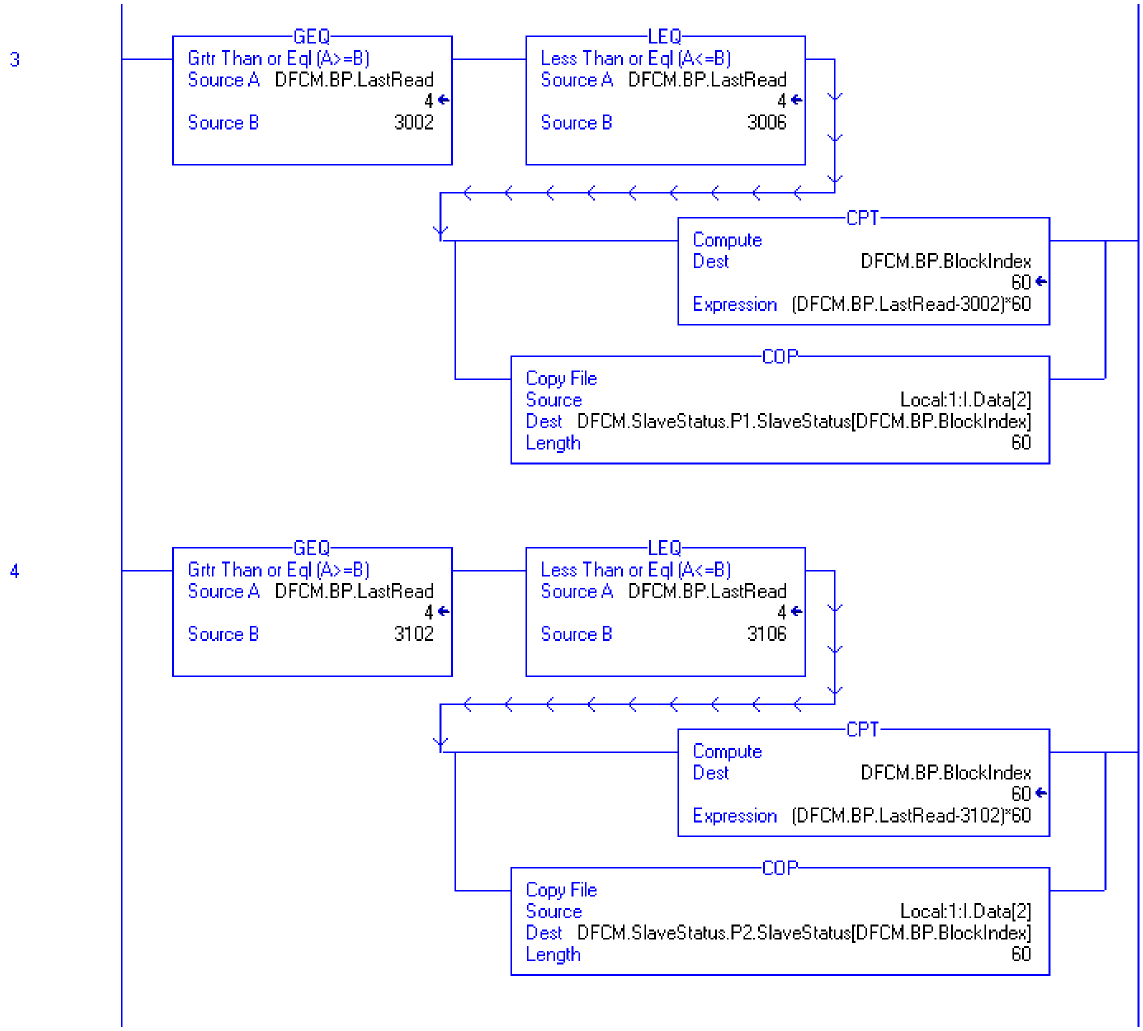
```
2
EQU
Equal
Source A   DFCM.BP.LastRead
                          3
Source B                 -1

EQU
Equal
Source A   DFCM.BP.LastRead
                          3
Source B                  0

COP
Copy File
Source              Local:1:I.Data[2]
Dest   DFCM.ModuleStatus.Pass_Cnt
Length                            1

COP
Copy File
Source              Local:1:I.Data[3]
Dest   DFCM.ModuleStatus.Prod[0]
Length                           16

COP
Copy File
Source              Local:1:I.Data[11]
Dest   DFCM.ModuleStatus.PortErr[0].CmdList
Length                            7

COP
Copy File
Source              Local:1:I.Data[18]
Dest   DFCM.ModuleStatus.PortErr[1].CmdList
Length                            7

COP
Copy File
Source              Local:1:I.Data[25]
Dest   DFCM.ModuleStatus.BlkStats.ReadCnt
Length                            6

COP
Copy File
Source              Local:1:I.Data[31]
Dest   DFCM.ModuleStatus.Port1_CurErr
Length                            4
```

The next rung of the ladder logic determines if the new data received in the input image is user data. If user data is present, the ladder logic will place the data in the correct location in the processor's read data area (**DFCM1.ReadData[]**). Up to 60, 120, or 240 data words can be transferred in each block transfer depending on the Block Transfer Size parameter.

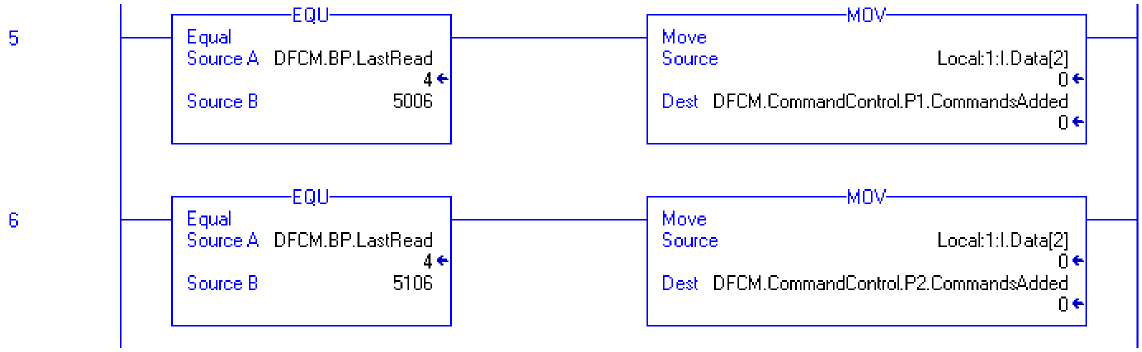


```
1
GEQ
Grtr Than or Eql (A>=B)
Source A   DFCM.BP.LastRead
                          4
Source B                  1

LEQ
Less Than or Eql (A<=B)
Source A   DFCM.BP.LastRead
                          4
Source B                 12

CPT
Compute
Dest                    DFCM.BP.BlockIndex
                                       120
Expression   (DFCM.BP.LastRead-1)*DFCM.BlockTransferSize

COP
Copy File
Source                   Local:1:I.Data[2]
Dest   DFCM.ReadData[DFCM.BP.BlockIndex]
Length              DFCM.BlockTransferSize
```

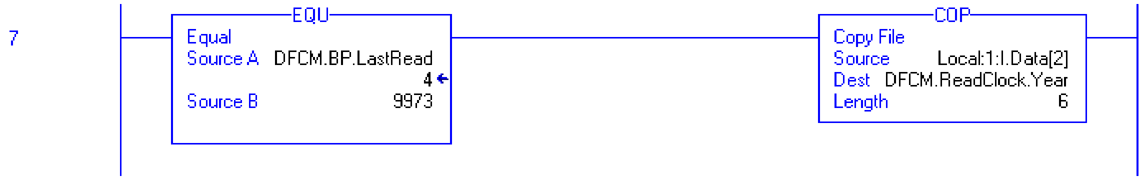
The next two rungs of ladder logic are used to handle the receipt of the slave node status data. These blocks are requested by the processor in the WriteData task and sent from the module to the processor. The two rungs below display the logic required to process these blocks:



The following ladder rungs handle the command control block responses for Port 1 and Port 2.

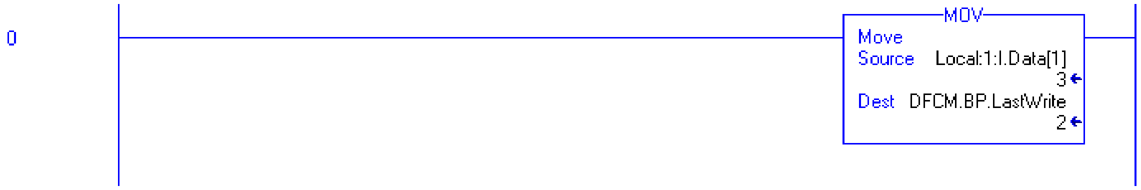

5
EQU
Equal
Source A DFCM.BP.LastRead
4
Source B 5006
MOV
Move
Source Local:1:I.Data[2]
0
Dest DFCM.CommandControl.P1.CommandsAdded
0
6
EQU
Equal
Source A DFCM.BP.LastRead
4
Source B 5106
MOV
Move
Source Local:1:I.Data[2]
0
Dest DFCM.CommandControl.P2.CommandsAdded
0

The following rung handles the block 9973 response from the module to the processor to read the time and date information.

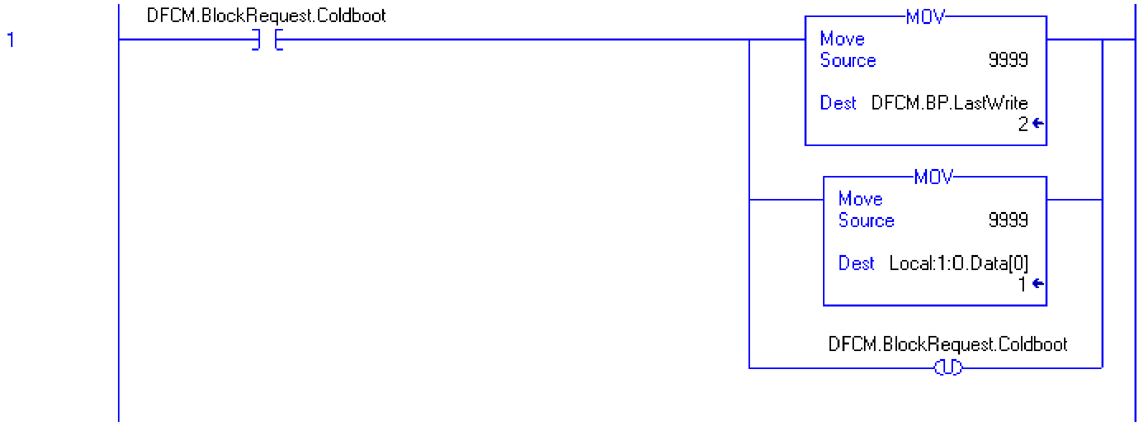


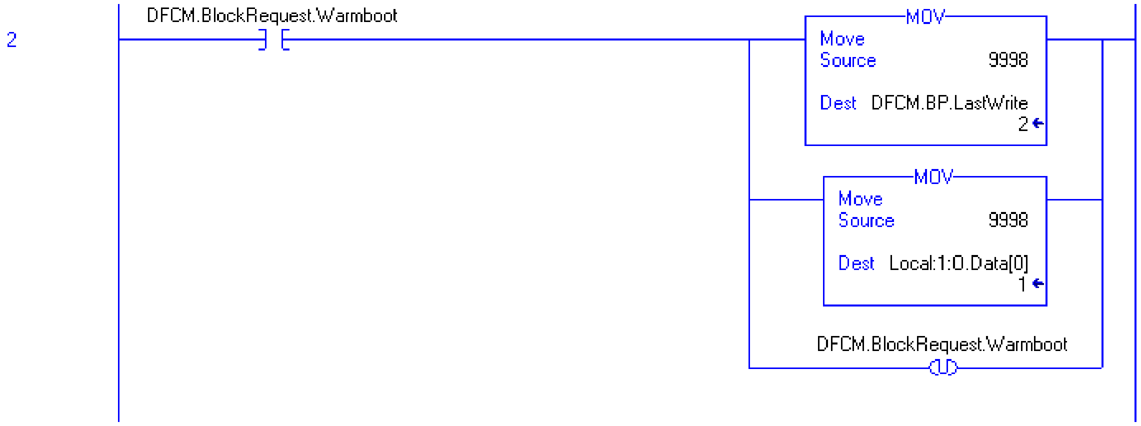
4.3 WriteData

The WriteData task is responsible for sending data from the processor to the MVI69-DFCM module. Data is transferred from the processor to the module using the module's output image (**Local:1:O:Data[]**). The first rung is used to store the currently requested data set in the module's **DFCM1.BP.LastWrite** data object. This object is used in all subsequent ladder logic in case the input word (**Local:1:I:Data[1]**) changes during processing.

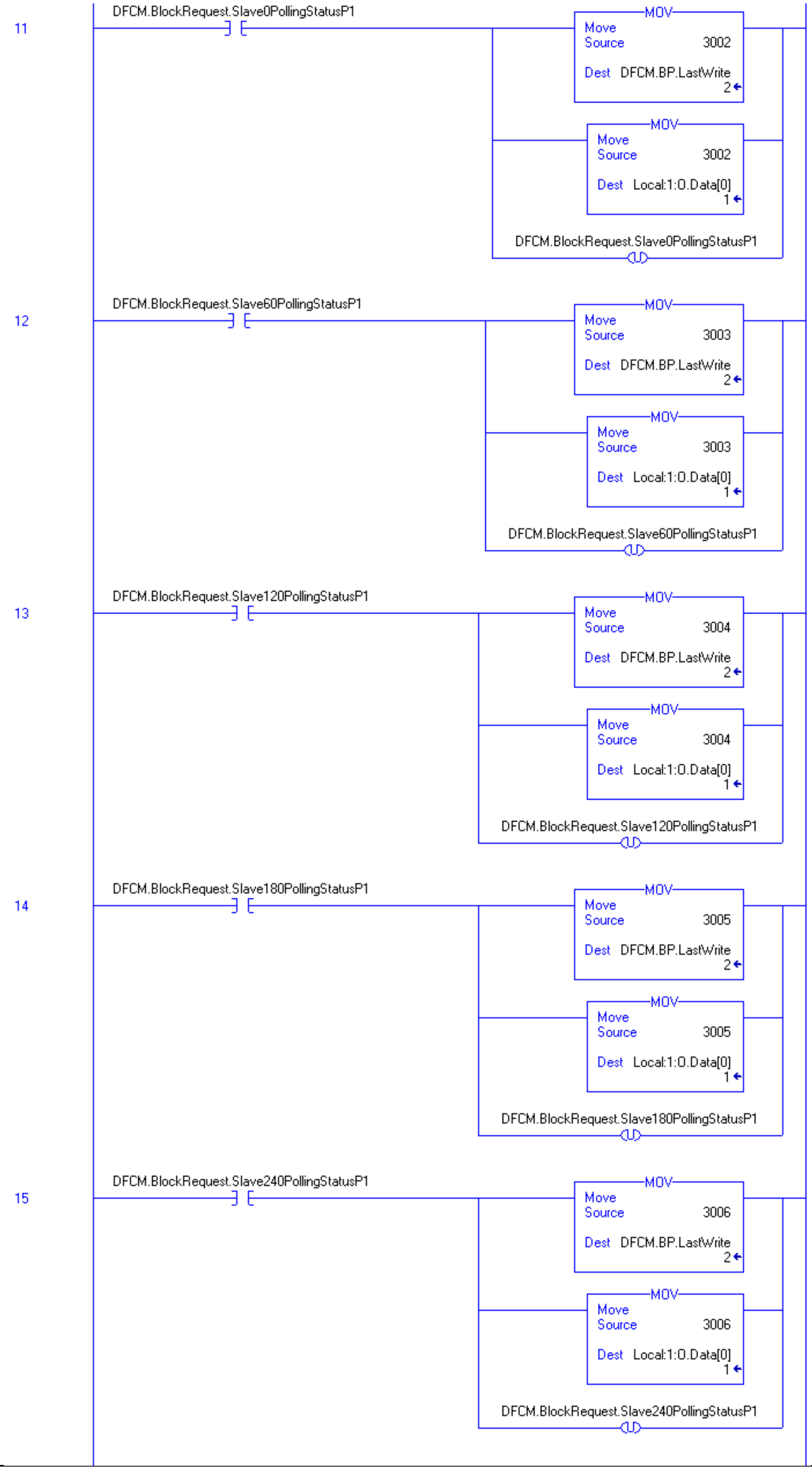


The next two rungs are used to handle processor control of the module using the warm- and cold- boot control block numbers. When the processor requires the module to perform one of these operations, it simply copies the block number into the output image of the module and the module will perform the operation.

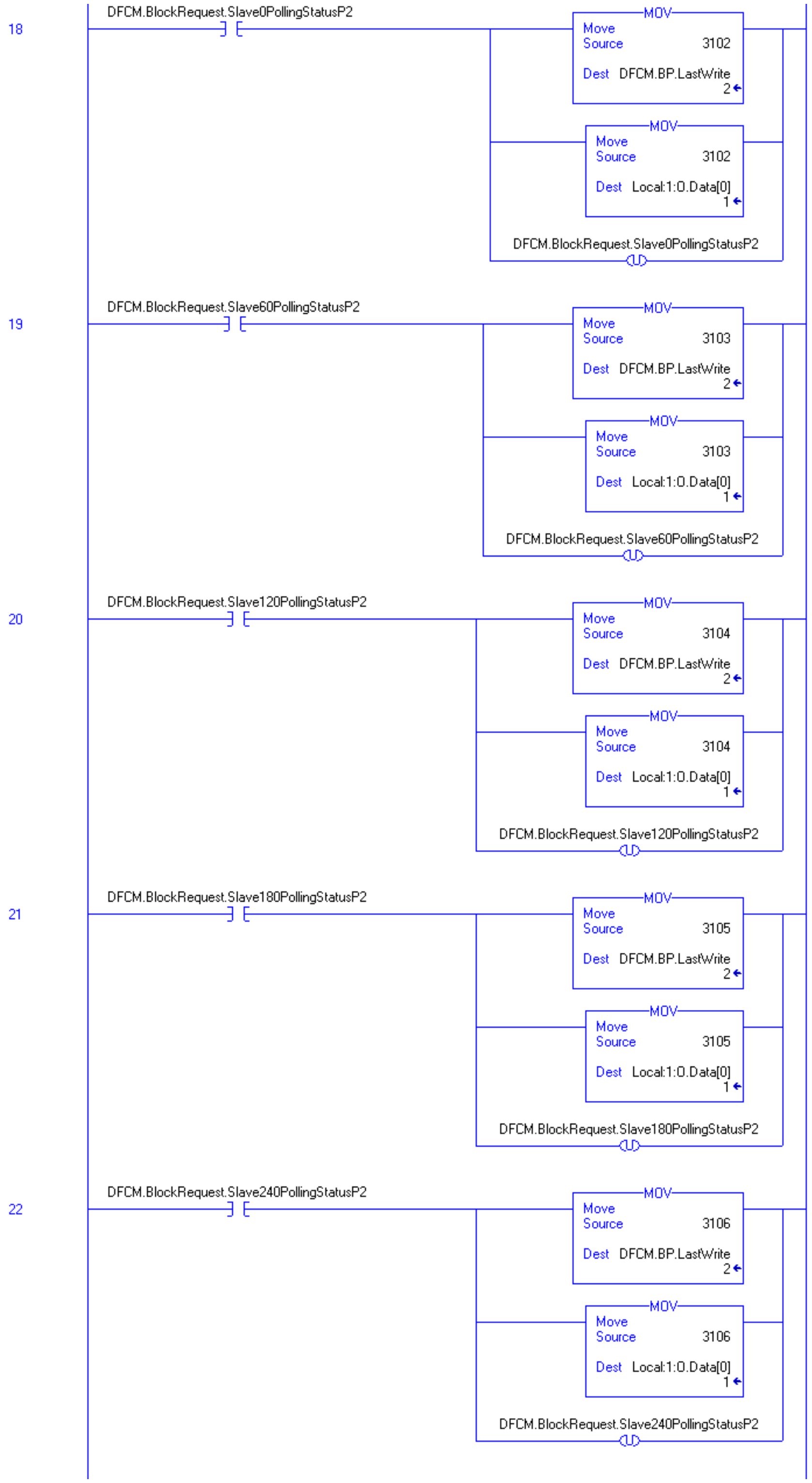




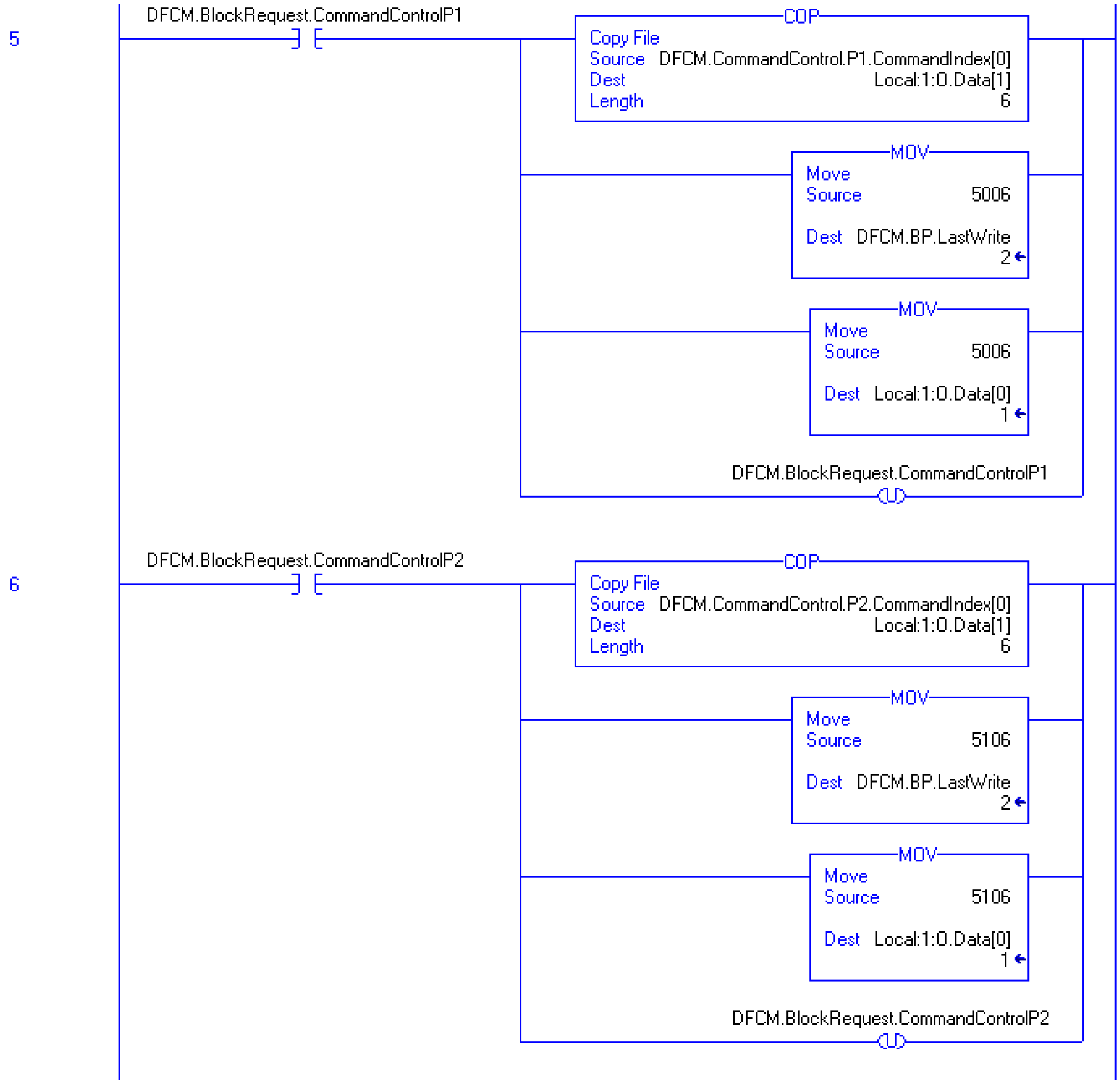
The next 10 rungs are used to request the slave node status data associated with each master port. Five requests are required for each port in order to obtain the data for the potential 256-slave addresses on a port. The ladder logic below displays that required to obtain the data for Port 1:


11
DFCM.BlockRequest.Slave0PollingStatusP1
MOV
Move
Source 3002
Dest DFCM.BP.LastWrite
2
MOV
Move
Source 3002
Dest Local:1:O.Data[0]
1
DFCM.BlockRequest.Slave0PollingStatusP1
U
12
DFCM.BlockRequest.Slave60PollingStatusP1
MOV
Move
Source 3003
Dest DFCM.BP.LastWrite
2
MOV
Move
Source 3003
Dest Local:1:O.Data[0]
1
DFCM.BlockRequest.Slave60PollingStatusP1
U
13
DFCM.BlockRequest.Slave120PollingStatusP1
MOV
Move
Source 3004
Dest DFCM.BP.LastWrite
2
MOV
Move
Source 3004
Dest Local:1:O.Data[0]
1
DFCM.BlockRequest.Slave120PollingStatusP1
U
14
DFCM.BlockRequest.Slave180PollingStatusP1
MOV
Move
Source 3005
Dest DFCM.BP.LastWrite
2
MOV
Move
Source 3005
Dest Local:1:O.Data[0]
1
DFCM.BlockRequest.Slave180PollingStatusP1
U
15
DFCM.BlockRequest.Slave240PollingStatusP1
MOV
Move
Source 3006
Dest DFCM.BP.LastWrite
2
MOV
Move
Source 3006
Dest Local:1:O.Data[0]
1
DFCM.BlockRequest.Slave240PollingStatusP1
U

The next five rungs display the logic for Port 2 slave status/control data:

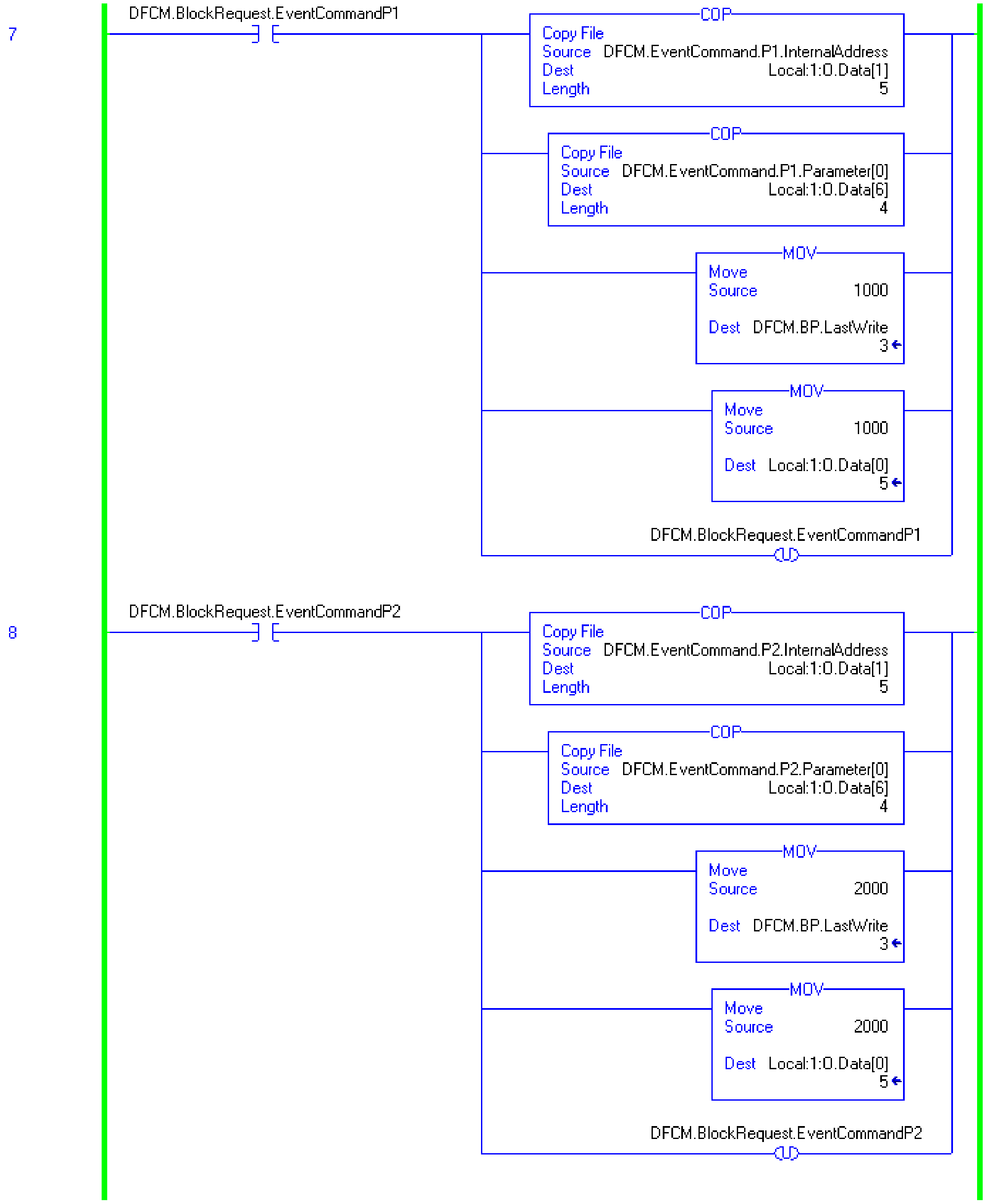


The next rung displays an example of command control. This block of data is passed from the processor to the module to execute a command in the master port's command list.



Up to six commands can be transferred from the command list to the command queue with one request.

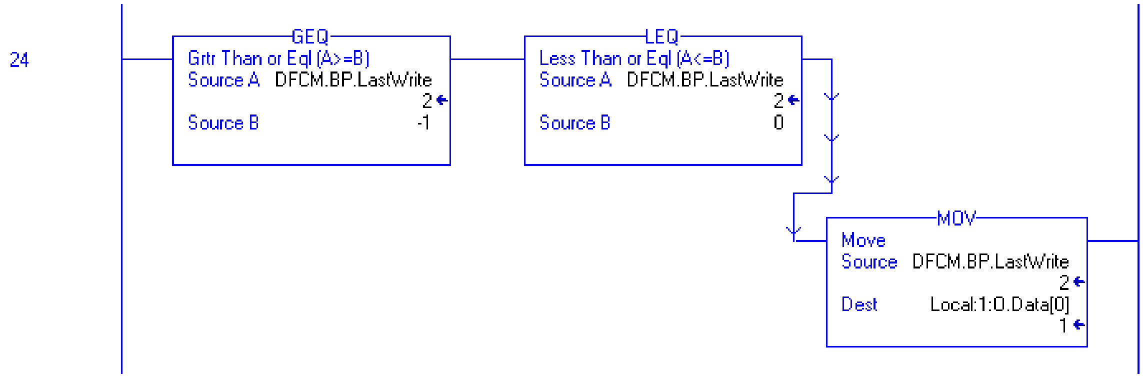
The next rung is used to issue an event message (user constructed message) on Port 1.



```
7   DFCM.BlockRequest.EventCommandP1
    ] [
        COP
        Copy File
        Source  DFCM.EventCommand.P1.InternalAddress
        Dest                        Local:1:O.Data[1]
        Length                                      5

        COP
        Copy File
        Source  DFCM.EventCommand.P1.Parameter[0]
        Dest                        Local:1:O.Data[6]
        Length                                      4

        MOV
        Move
        Source              1000
        Dest   DFCM.BP.LastWrite
                               3←

        MOV
        Move
        Source              1000
        Dest   Local:1:O.Data[0]
                               5←

        DFCM.BlockRequest.EventCommandP1
        (U)

8   DFCM.BlockRequest.EventCommandP2
    ] [
        COP
        Copy File
        Source  DFCM.EventCommand.P2.InternalAddress
        Dest                        Local:1:O.Data[1]
        Length                                      5

        COP
        Copy File
        Source  DFCM.EventCommand.P2.Parameter[0]
        Dest                        Local:1:O.Data[6]
        Length                                      4

        MOV
        Move
        Source              2000
        Dest   DFCM.BP.LastWrite
                               3←

        MOV
        Move
        Source              2000
        Dest   Local:1:O.Data[0]
                               5←

        DFCM.BlockRequest.EventCommandP2
        (U)
```

When the DFCM.BlockRequest.EventCommandP1 bit is set, the rung will execute. It will place the command contained in the rung in the command queue for execution. This technique can be used to issue commands on a port without constructing a master command list or to execute commands that are to be issued under special conditions.

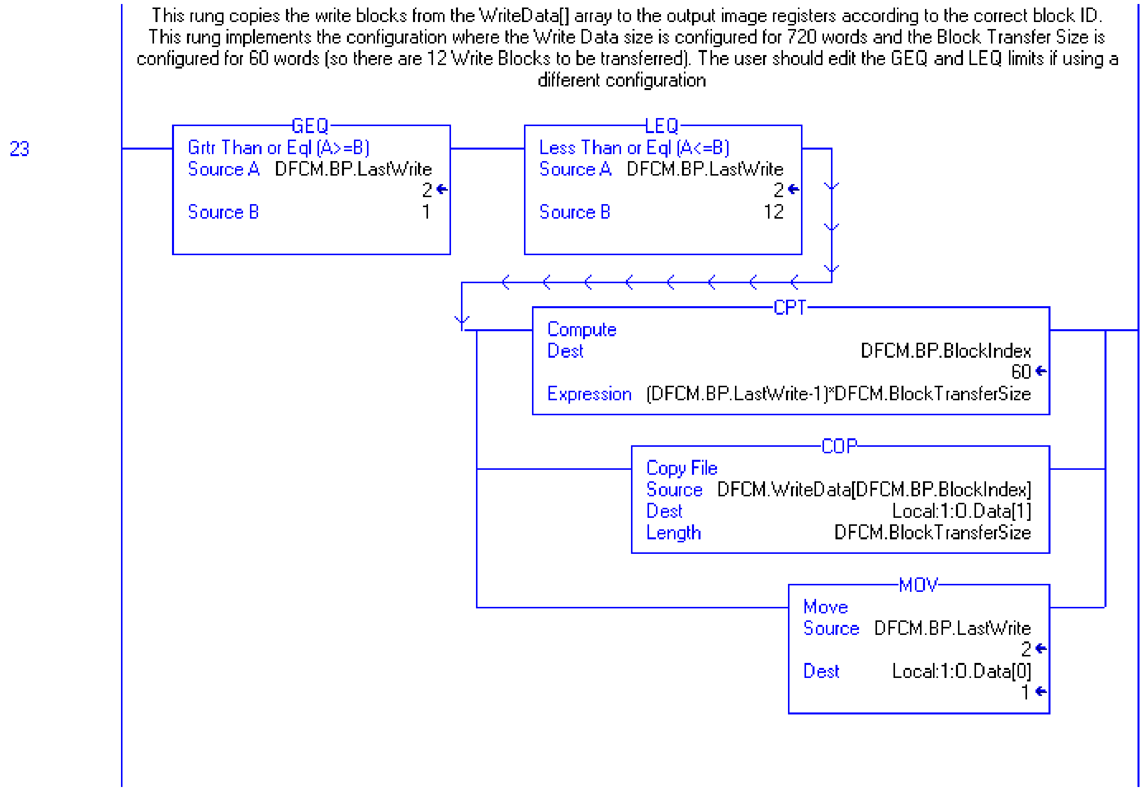
If the module is configured for no or only one block transfer, special processing is required. The module must observe the first word of the module's output image changing in order to recognize the receipt of new data. If the value never changes, the module will not process the data. This presents a problem when fewer than two blocks are to be transferred to the module from the processor. To overcome this problem, the module will send -1 and 0 in the input word. When the module is configured for zero write blocks, the following block request sequence will be present: -1, 0, -1, 0... When the module is configured for one write block, the following block request sequence will be present: 1, 0, 1, 0, 1, 0... The rung below is required to handle these conditions.



```
24
GEQ
Grtr Than or Eql (A>=B)
Source A   DFCM.BP.LastWrite
                          2
Source B                 -1

LEQ
Less Than or Eql (A<=B)
Source A   DFCM.BP.LastWrite
                          2
Source B                  0

MOV
Move
Source   DFCM.BP.LastWrite
                        2
Dest       Local:1:O.Data[0]
                        1
```

The next rung in the ladder logic is the most important. It handles the transfer of processor data to the module. Up to 240 words of user data held in the processor (**DFCM1.WriteData[]**) can be transferred to the module at one time.

The number of words per block is given by the Block Transfer Size parameter (60, 120, or 240). The parameter DFCMBlockTransferSize should match the value configured by the user in the configuration file.



This rung copies the write blocks from the WriteData[] array to the output image registers according to the correct block ID. This rung implements the configuration where the Write Data size is configured for 720 words and the Block Transfer Size is configured for 60 words (so there are 12 Write Blocks to be transferred). The user should edit the GEQ and LEQ limits if using a different configuration

```
23
GEQ
Grtr Than or Eql (A>=B)
Source A   DFCM.BP.LastWrite
                          2
Source B                  1

LEQ
Less Than or Eql (A<=B)
Source A   DFCM.BP.LastWrite
                          2
Source B                 12

CPT
Compute
Dest                                DFCM.BP.BlockIndex
                                                    60
Expression  (DFCM.BP.LastWrite-1)*DFCM.BlockTransferSize

COP
Copy File
Source  DFCM.WriteData[DFCM.BP.BlockIndex]
Dest                      Local:1:O.Data[1]
Length                DFCM.BlockTransferSize

MOV
Move
Source   DFCM.BP.LastWrite
                        2
Dest       Local:1:O.Data[0]
                        1
```

5 Diagnostics and Troubleshooting

The module provides diagnostic information in four forms to the user.

1) Status Data values are transferred from the module to the controller tags in the CompactLogix processor.
2) Status data is available to other nodes on the network by reading of module's internal database area containing status data.
3) All data contained in the module can be viewed through the configuration/debug port to an attached terminal emulator.
4) LED status indicators on the front of the module yield information on the modules status.

The following sections explain how to obtain the Status Data from the module and the meaning of the individual LED's on the module.

5.1 Reading Status Data from the module

The MVI69-DFCM module returns a 29-word Status Data block that can be used to determine the module’s operating status. This data is located in the module's database at registers 7600 to 7628 and at the location specified in the configuration. This data is transferred to the CompactLogix processor continuously with each read block.

5.2 LED Status Indicators

The LED's will indicate the module’s operating status as follows:

ProSoft Module	Color	Status	Indication
CFG	Green	On	Data is being transferred between the module and a remote terminal using the Configuration/Debug port.
		Off	No data is being transferred on the Configuration/Debug port.
P1	Green	On	Data is being transferred between the module and the DF1 network on Port 1.
		Off	No data is being transferred on the port.
P2	Green	On	Data is being transferred between the module and the DF1 network on Port 2.
		Off	No data is being transferred on the port.
APP	Amber	On	The MVI69-DFCM module program has recognized a communication error on one of its ports.
		Off	The MVI69-DFCM is functioning normally.
BP ACT	Amber	On	The LED is on when the module is performing a write operation on the backplane.
		Off	The LED is off when the module is performing a read operation on the backplane. Under normal operation, the LED should blink rapidly on and off.

ACT/FLT	Red/ Green	Off	The card is not receiving any power and is not securely plugged into the rack.
		Green	The module is operating normally.
		Red	The program has detected an error or is being configured. If the LED remains red for over 10 seconds, the program has probably halted. Remove the card from the rack and re-insert the card to restart the module's program.
BAT	Red	Off	The battery voltage is OK and functioning.
		On	The battery voltage is low or the battery is not present. Replace the battery on the module.

During module configuration, the ACT/FLT LED will be red and the APP and BP ACT LED's will be on.

If the APP, BP ACT and ACT/FLT LED's blink at a rate of every one-second, call ProSoft Technology, Inc. support. There is a serious problem with the module, and it will have to be sent back to ProSoft.

5.3 Clearing a Fault Condition

Typically, if the ACT/FAULT LED on the front of the module becomes illuminated red for over ten seconds, a hardware problem has been detected in the module or the program has exited. To attempt to clear the condition:

1. Remove the card from the rack and re-insert the card in the rack
2. Verify the configuration data being transferred to the module from the CompactLogix processor

If the module's ACT/FAULT LED does not turn green, make sure the module is inserted completely into the rack. If this does not cure the problem, contact the factory.

5.4 Troubleshooting

In order to assist in the troubleshooting of the module, the following table has been put together to assist you. Please use the following to help in using the module, but if you have additional questions or problems, please do not hesitate to contact us.

The entries in this section have been placed in the order in which the problems would most likely occur after powering up the module.

Problem Description	Steps to take
Processor Fault	1) Be sure that the module is plugged into the slot that has been configured for the MVI69-DFCM module. 2) Assure that the slot in the rack configuration has been set up correctly:
Processor I/O LED flashes	This indicates there is a problem with backplane communications. Be certain this and all modules in the rack are configured in the processor.
BP ACT LED remains off or blinks slowly	This indicates that backplane transfer operations are failing. Use the Configuration/Debug port facility to check this. To establish backplane communications make sure of the following: 1. The backplane driver is loaded in the module. 2. The module is configured for read and write block data transfer. 3. The ladder logic handles all read and write block

	situations. 4. The module is configured in the processor.
ACT/FLT LED remains red	The program has halted or a critical error has occurred. Connect to the Configuration/Debug port to see if the module is running. If the program has halted, remove the card from the rack and re-insert the card in the rack.

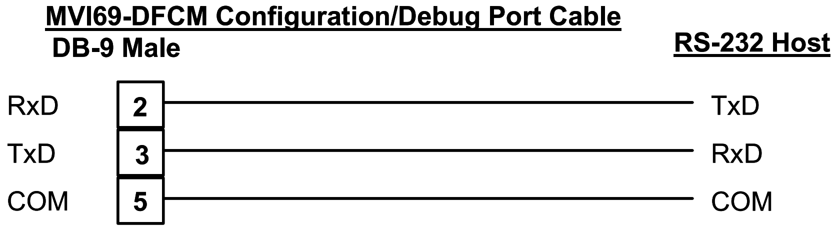
5.5 Using the Configuration/Debug Port

5.5.1 Required Hardware

The hardware requirements to interface with the configuration/debugger port are not too stringent. A personal computer with a standard serial port should suffice. For optimal performance, the minimum is required:

80468 based processor (Pentium preferred)
1 megabyte of memory
At least one serial communications port available

Additionally, a null-modem cable is required between your PC and the port. The module's port has a DB-9 male connector at the end of a RJ-45 to DB-9 pigtail. The RJ-45 end of the cable is to be placed in the MVI69-DFCM port 1 connector (top port). The cable required is displayed below:



5.6 Required Software

The software required on your personal computer to interface with the configuration/debugger port is operating system dependent. Tested software include the following:

DOS	ProComm, PS-Term and several other terminal emulation programs
Windows 3.1	Terminal
Windows 95/98	HyperTerminal and PS-Term
Windows NT	HyperTerminal
Linux	Minicom

Any ASCII terminal emulation software package provided with your operating system should work as long as it can be configured as follows:

Baud Rate	57,600
Parity	None
Data Bits	8
Stop Bits	1

5.7 USING THE PORT

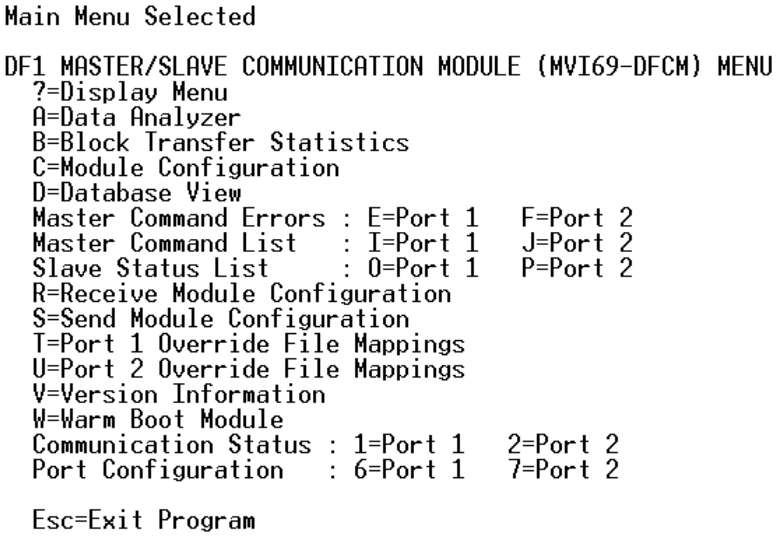
The following steps are required to interface with the configuration/debugger port:

1. Connect your computer to the module's port using a null-modem cable.
2. Start the terminal emulation program on your computer and configure the communication parameters to those shown in the Required Software section (57K, N, 8, 1).
3. Enter the '?' character on your computer. If everything is set up correctly, the port's menu will be displayed.

If there is no response from the module, check the communication setup and the cable. In addition, make sure you are connected to the correct port on your computer and the module.

5.7.1 Menu Options

Features available through the use of the configuration/debug port on the MVI69-DFCM module are all reached using single keystrokes on your computer. There is a single main menu and several sub-menus presented on the port. To view the current selections available, press the '?' key on your computer. If you are in main menu mode, the following menu will be displayed:

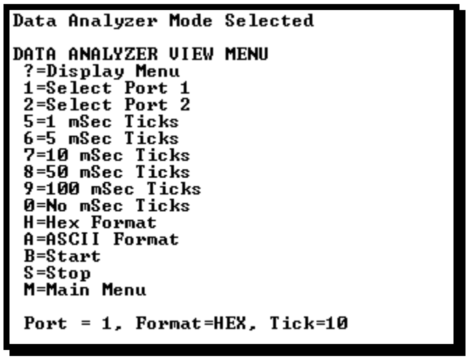


```
Main Menu Selected

DF1 MASTER/SLAVE COMMUNICATION MODULE (MVI69-DFCM) MENU
  ?=Display Menu
  A=Data Analyzer
  B=Block Transfer Statistics
  C=Module Configuration
  D=Database View
  Master Command Errors : E=Port 1   F=Port 2
  Master Command List   : I=Port 1   J=Port 2
  Slave Status List     : O=Port 1   P=Port 2
  R=Receive Module Configuration
  S=Send Module Configuration
  T=Port 1 Override File Mappings
  U=Port 2 Override File Mappings
  V=Version Information
  W=Warm Boot Module
  Communication Status : 1=Port 1   2=Port 2
  Port Configuration   : 6=Port 1   7=Port 2

  Esc=Exit Program
```

If this menu is not displayed, press the 'M' key to display the main menu. All facilities offered by the configuration/debugger are shown on the main menu. Each option is discussed below:

5.7.1.1 A = Data Analyzer

Selection of this menu option places the program in analyzer menu mode. This mode of operation is used to display DF1 messages generated and received by the module. To view the menu options available in this mode, press the '?' key and the following menu will be displayed:



```
Data Analyzer Mode Selected

DATA ANALYZER VIEW MENU
 ?=Display Menu
 1=Select Port 1
 2=Select Port 2
 5=1 mSec Ticks
 6=5 mSec Ticks
 7=10 mSec Ticks
 8=50 mSec Ticks
 9=100 mSec Ticks
 0=No mSec Ticks
 H=Hex Format
 A=ASCII Format
 B=Start
 S=Stop
 M=Main Menu

 Port = 1, Format=HEX, Tick=10
```

This tool is extremely useful in determining the operation of the module and nodes on the network of each port. The parameters shown at the bottom of the display show the current analyzer settings. Each of the menu options is discussed in the sections below:

1=Select Port 1
This option is used to select Port 1 for analysis. Data displayed when in analyzer mode will relate to this port.

2=Select Port 2
This option is used to select the Port 2 for analysis. Data displayed when in analyzer mode will relate to this port.

5=1 mSec Ticks
This option is used to generate 1-millisecond timing marks on the display. This may help when determining communication-timing characteristics.

6=5 mSec Ticks
This option is used to generate 5-millisecond timing marks on the display. This may help when determining communication-timing characteristics.

7=10 mSec Ticks
This option is used to generate 10-millisecond timing marks on the display. This may help when determining communication-timing characteristics.

8=50 mSec Ticks
This option is used to generate 50-millisecond timing marks on the display. This may help when determining communication-timing characteristics.

9=100 mSec Ticks
This option is used to generate 100-millisecond timing marks on the display. This may help when determining communication-timing characteristics.

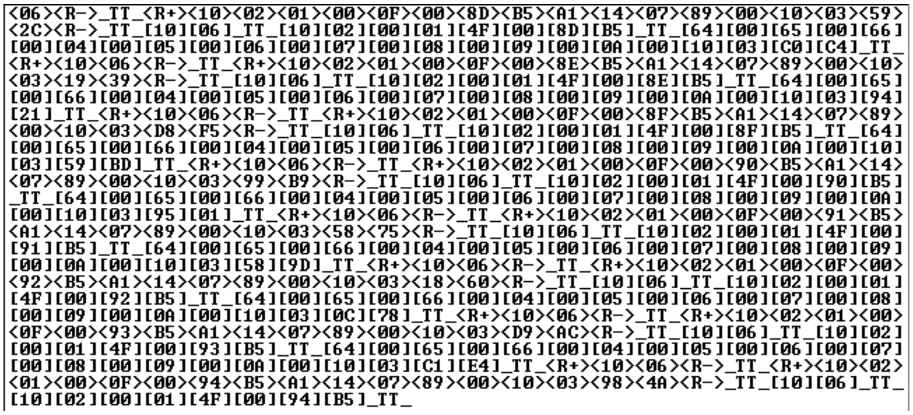
0=No mSec Ticks
This option is used to turn the display of timing marks off.

H=Hex Format
This option is used to select the display of the data in hexadecimal format. This format is most useful when viewing DF1 protocol messages.

A=ASCII Format
This option is used to select the display of the data in ASCII format. This format is most useful when viewing ASCII messages.

B=Start

This option is used to start the data analyzer. After the key is pressed, all data transmitted and received on the currently selected port will be displayed. An example display is shown below:



```
<06><R->_TT_<R+><10><02><01><00><0F><00><8D><B5><A1><14><07><89><00><10><03><59>
<2C><R->_TT_[10][06]_TT_[10][02][00][01][4F][00][8D][B5]_TT_[64][00][65][00][66]
[00][04][00][05][00][06][00][07][00][08][00][09][00][0A][00][10][03][C0][C4]_TT_
<R+><10><06><R->_TT_<R+><10><02><01><00><0F><00><8E><B5><A1><14><07><89><00><10>
<03><19><39><R->_TT_[10][06]_TT_[10][02][00][01][4F][00][8E][B5]_TT_[64][00][65]
[00][66][00][04][00][05][00][06][00][07][00][08][00][09][00][0A][00][10][03][94]
[21]_TT_<R+><10><06><R->_TT_<R+><10><02><01><00><0F><00><8F><B5><A1><14><07><89>
<00><10><03><D8><F5><R->_TT_[10][06]_TT_[10][02][00][01][4F][00][8F][B5]_TT_[64]
[00][65][00][66][00][04][00][05][00][06][00][07][00][08][00][09][00][0A][00][10]
[03][59][BD]_TT_<R+><10><06><R->_TT_<R+><10><02><01><00><0F><00><90><B5><A1><14>
<07><89><00><10><03><99><B9><R->_TT_[10][06]_TT_[10][02][00][01][4F][00][90][B5]
_TT_[64][00][65][00][66][00][04][00][05][00][06][00][07][00][08][00][09][00][0A]
[00][10][03][95][01]_TT_<R+><10><06><R->_TT_<R+><10><02><01><00><0F><00><91><B5>
<A1><14><07><89><00><10><03><58><75><R->_TT_[10][06]_TT_[10][02][00][01][4F][00]
[91][B5]_TT_[64][00][65][00][66][00][04][00][05][00][06][00][07][00][08][00][09]
[00][0A][00][10][03][58][9D]_TT_<R+><10><06><R->_TT_<R+><10><02><01><00><0F><00>
<92><B5><A1><14><07><89><00><10><03><18><60><R->_TT_[10][06]_TT_[10][02][00][01]
[4F][00][92][B5]_TT_[64][00][65][00][66][00][04][00][05][00][06][00][07][00][08]
[00][09][00][0A][00][10][03][0C][78]_TT_<R+><10><06><R->_TT_<R+><10><02><01><00>
<0F><00><93><B5><A1><14><07><89><00><10><03><D9><AC><R->_TT_[10][06]_TT_[10][02]
[00][01][4F][00][93][B5]_TT_[64][00][65][00][66][00][04][00][05][00][06][00][07]
[00][08][00][09][00][0A][00][10][03][C1][E4]_TT_<R+><10><06><R->_TT_<R+><10><02>
<01><00><0F><00><94><B5><A1><14><07><89><00><10><03><98><4A><R->_TT_[10][06]_TT_
[10][02][00][01][4F][00][94][B5]_TT_
```

Special characters used in the display are as follows:

[ ]	Data enclosed in these characters represent data received on the port.
< >	Data enclosed in these characters represent data transmitted on the port.
<R+>	These characters are inserted when the RTS line is driven high on the port.
<R->	These characters are inserted when the RTS line is dropped low on the port.
<CS>	These characters are displayed when the CTS line is recognized high.
_TT_	These characters are displayed when the timing mark interval has been reached. This parameter is user defined.

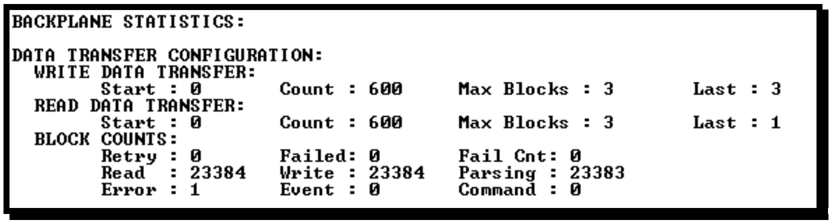
S=Stop
This option is used to stop the analyzer. Use this option to freeze the display so the data can be analyzed. To restart the analyzer, press the 'B' key.

WARNING -- When in analyzer mode, program execution will slow down. Only use this tool during a trouble-shooting session. Disable the analyzer before leaving the module to run in its normal mode.

M = Main Menu
This menu option is used to return to the main menu mode.

5.7.1.2 B = Block Transfer Statistics

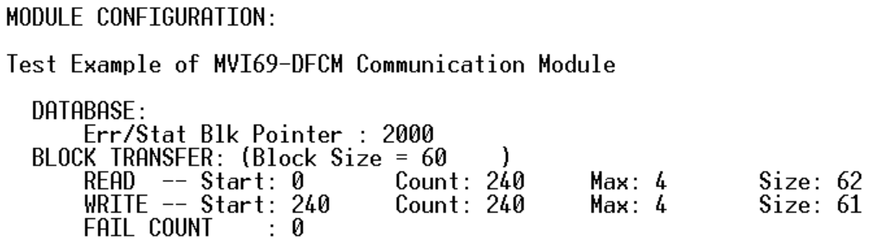
This menu option is used to display the configuration and statistics of the backplane data transfer operations. After selecting this option, the following will be displayed. Selecting this option at one-second intervals can be used to determine the number of blocks transferred each second.



```
BACKPLANE STATISTICS:

DATA TRANSFER CONFIGURATION:
  WRITE DATA TRANSFER:
        Start : 0       Count : 600     Max Blocks : 3       Last : 3
  READ DATA TRANSFER:
        Start : 0       Count : 600     Max Blocks : 3       Last : 1
  BLOCK COUNTS:
        Retry : 0       Failed: 0       Fail Cnt: 0
        Read  : 23384   Write : 23384   Parsing : 23383
        Error : 1       Event : 0       Command : 0
```

5.7.1.3 C = Module Configuration

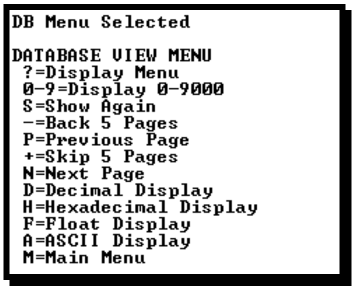
This option displays the general module configuration information for the MVI69-DFCM module. After selecting the option, the following screen will be displayed:



```
MODULE CONFIGURATION:

Test Example of MVI69-DFCM Communication Module

  DATABASE:
      Err/Stat Blk Pointer : 2000
  BLOCK TRANSFER: (Block Size = 60    )
      READ  -- Start: 0       Count: 240     Max: 4       Size: 62
      WRITE -- Start: 240     Count: 240     Max: 4       Size: 61
      FAIL COUNT    : 0
```

5.7.1.4 D = Database View

Selection of this menu option places the program in database view menu mode. This mode of operation is used to display the module's internal database values. To view the menu options available in this mode, press the '?' key and the following menu will be displayed:



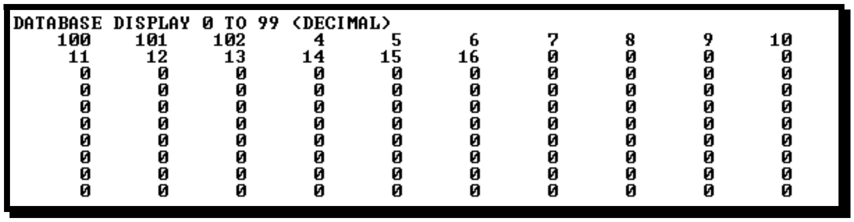
```
DB Menu Selected

DATABASE VIEW MENU
 ?=Display Menu
 0-9=Display 0-9000
 S=Show Again
 -=Back 5 Pages
 P=Previous Page
 +=Skip 5 Pages
 N=Next Page
 D=Decimal Display
 H=Hexadecimal Display
 F=Float Display
 A=ASCII Display
 M=Main Menu
```

All data contained in the module's database is available for viewing using the menu options. Each option available on the menu is discussed in the sections below:

0-9 = Register pages 0-9000
This menu option is used to jump to a specific set of registers in the database and display the data. The keys perform the following functions:

Key	FUNCTION
0	Display registers 0 to 99
1	Display registers 1000 to 1099
2	Display registers 2000 to 2099
3	Display registers 3000 to 3099
4	Display registers 4000 to 4099
5	Display registers 5000 to 5099
6	Display registers 6000 to 6099
7	Display registers 7000 to 7099
8	Display registers 8000 to 8099
9	Display registers 9000 to 9099

S = Show Again
This menu option is used to display the current page of 100 registers in the database. Example output of the database display is shown below:



```
DATABASE DISPLAY 0 TO 99 (DECIMAL)
     100    101    102      4      5      6      7      8      9     10
      11     12     13     14     15     16      0      0      0      0
       0      0      0      0      0      0      0      0      0      0
       0      0      0      0      0      0      0      0      0      0
       0      0      0      0      0      0      0      0      0      0
       0      0      0      0      0      0      0      0      0      0
       0      0      0      0      0      0      0      0      0      0
       0      0      0      0      0      0      0      0      0      0
       0      0      0      0      0      0      0      0      0      0
       0      0      0      0      0      0      0      0      0      0
```

- = Back 5 Pages
This menu option is used to skip the previous 500 registers of data for viewing and display the data.

P = Previous Page
This menu option is used to select and display the previous 100 registers of data.

+ = Skip 5 Pages
This menu option is used to skip 500 registers of data and to display the new page of data.

N = Next Page
This menu option is used to select the next 100 registers of data for viewing and displays the data.

D = Decimal Display
This menu option is used to display the data on the current page in decimal format.

H = Hexadecimal Display
This menu option is used to display the data on the current page in hexadecimal format.

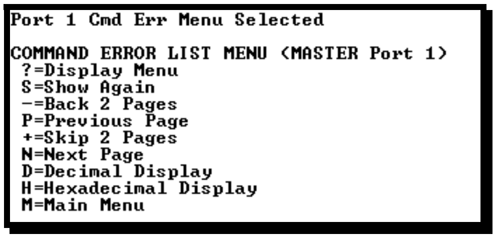
F = Float Display
This menu option is used to display the data on the current page in floating-point format. The program assumes that the values are aligned on even register boundaries. If floating-point values are not aligned as such, they will not be displayed properly.

A = ASCII Display
This menu option is used to display the data on the current page in ASCII format. This is useful for regions of the database that contain ASCII data.

M = Main Menu
This menu option is used to return to the main menu mode.

5.7.1.5 E and F = Master Command Errors (Ports 1 and 2)

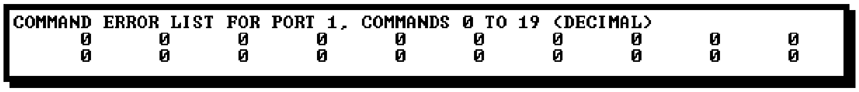
Selection of these menu options places the program in master command error menu mode for the specified port. This mode of operation is used to display multiple pages of master command list error/status data. To view the menu options available in this mode, press the '?' key and the following menu will be displayed:



```
Port 1 Cmd Err Menu Selected

COMMAND ERROR LIST MENU (MASTER Port 1)
 ?=Display Menu
 S=Show Again
 -=Back 2 Pages
 P=Previous Page
 +=Skip 2 Pages
 N=Next Page
 D=Decimal Display
 H=Hexadecimal Display
 M=Main Menu
```

Each menu option is discussed in the following sections:

S = Show Again
This option is used to display the current page of master command error/status data. After selecting the option, the following screen will be displayed.



```
COMMAND ERROR LIST FOR PORT 1, COMMANDS 0 TO 19 (DECIMAL)
      0      0      0      0      0      0      0      0      0      0
      0      0      0      0      0      0      0      0      0      0
```

Each value displayed on the screen corresponds to the error/status code for the associated master command list index

- = Back 2 Pages
This option is used to skip back 20 commands and display the data.

P = Previous Page
This option is used to display the previous page of data.

+ = Skip 2 Pages
This option is used to skip past the next 20 commands and display the data.

N = Next Page
This option is used to display the next page of master command list error/status data.

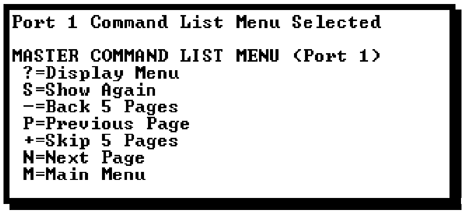
D = Decimal Display
This option is used to change the display of the data to decimal format.

H = Hexadecimal Display
This option is used to change the display of error/status data to hexadecimal format.

M = Main Menu
This option is used to return the program to main menu mode.

5.7.1.6 I and J = Master Command List (Ports 1 and 2)

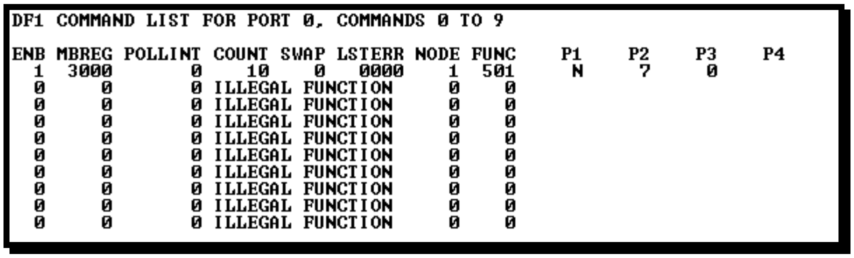
Selection of these menu options places the program in master command list menu mode for the specified port. This mode of operation is used to display multiple pages of master command list data. To view the menu options available in this mode, press the '?' key and the following menu will be displayed:



```
Port 1 Command List Menu Selected

MASTER COMMAND LIST MENU (Port 1)
 ?=Display Menu
 S=Show Again
 -=Back 5 Pages
 P=Previous Page
 +=Skip 5 Pages
 N=Next Page
 M=Main Menu
```

Each option on the menu is discussed in the following sections:

S = Show Again
This option is used to display the current page of master commands. Ten commands are displayed on each page as shown below:



```
DF1 COMMAND LIST FOR PORT 0, COMMANDS 0 TO 9

ENB MBREG POLLINT COUNT SWAP LSTERR NODE FUNC    P1    P2    P3    P4
  1  3000       0    10    0   0000    1  501     N     7     0
  0     0       0 ILLEGAL FUNCTION     0    0
  0     0       0 ILLEGAL FUNCTION     0    0
  0     0       0 ILLEGAL FUNCTION     0    0
  0     0       0 ILLEGAL FUNCTION     0    0
  0     0       0 ILLEGAL FUNCTION     0    0
  0     0       0 ILLEGAL FUNCTION     0    0
  0     0       0 ILLEGAL FUNCTION     0    0
  0     0       0 ILLEGAL FUNCTION     0    0
  0     0       0 ILLEGAL FUNCTION     0    0
```

- = Back 5 Pages
This menu option is used to display the master command list data after skipping the previous 50 commands.

P = Previous Page
This menu option is used to display the previous page of master command list data.

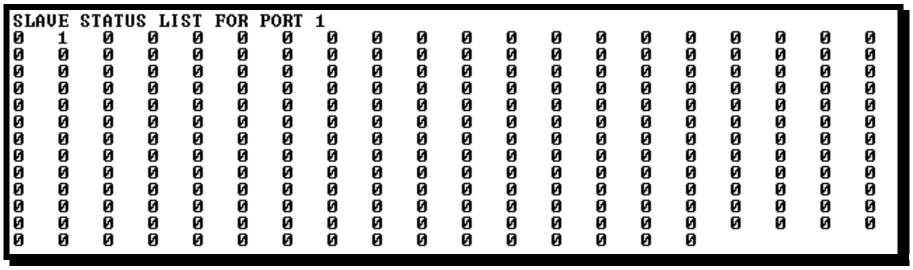
+ = Skip 5 Pages
This menu option is used to display the master command list data after skipping the next 50 commands.

N = Next Page
This menu option is used to display the next page of master command list data.

M = Main Menu
This option is used to return to the main menu mode of operation.

5.7.1.7 O and P = Slave Status List (Port 1 and 2)

Selection of these menu options displays the 256 slave status values associated with the ports. Values shown have the following definitions: 0 = slave is not used, 1 = slave being actively polled, 2 = slave suspended and 3 = slave disabled.



```
SLAVE STATUS LIST FOR PORT 1
0   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

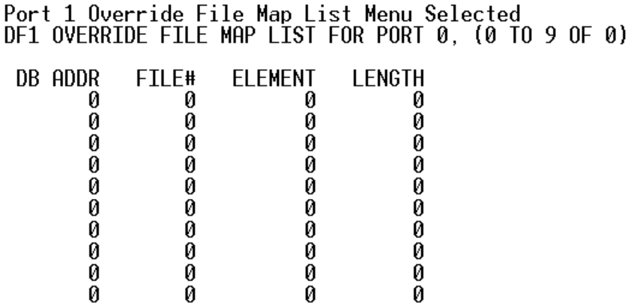
5.7.1.8 R = Receive Module Configuration

Selection of this menu item allows you to upload a configuration file to the module. See Appendix F for a complete procedure.

5.7.1.9 S = Send Module Configuration

Selection of this menu item allows you to download a configuration file from the module to your PC for editing. See Appendix F for a complete procedure.

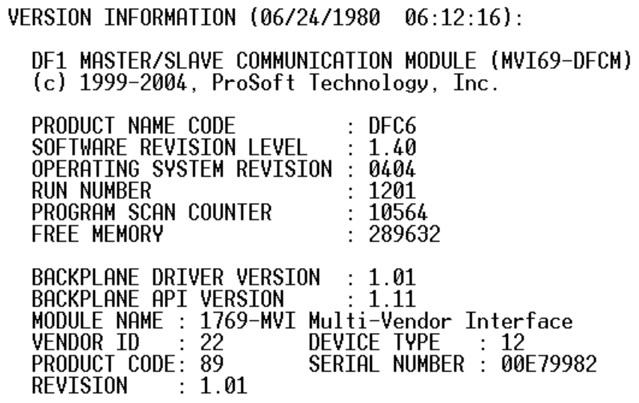
5.7.1.10 T or U = DF1 Override File Map List for Port 1 or Port 2



```
Port 1 Override File Map List Menu Selected
DF1 OVERRIDE FILE MAP LIST FOR PORT 0, (0 TO 9 OF 0)

 DB ADDR   FILE#   ELEMENT   LENGTH
       0       0         0        0
       0       0         0        0
       0       0         0        0
       0       0         0        0
       0       0         0        0
       0       0         0        0
       0       0         0        0
       0       0         0        0
       0       0         0        0
       0       0         0        0
```

5.7.1.11 V = Version Information

This option is used to view the current version of the software for the module and other important values. After selecting the option, the following will be displayed:

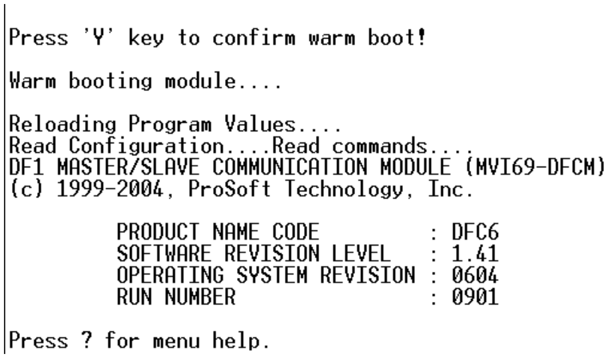


```
VERSION INFORMATION (06/24/1980  06:12:16):

  DF1 MASTER/SLAVE COMMUNICATION MODULE (MVI69-DFCM)
  (c) 1999-2004, ProSoft Technology, Inc.

  PRODUCT NAME CODE         : DFC6
  SOFTWARE REVISION LEVEL   : 1.40
  OPERATING SYSTEM REVISION : 0404
  RUN NUMBER                : 1201
  PROGRAM SCAN COUNTER      : 10564
  FREE MEMORY               : 289632

  BACKPLANE DRIVER VERSION  : 1.01
  BACKPLANE API VERSION     : 1.11
  MODULE NAME : 1769-MVI Multi-Vendor Interface
  VENDOR ID   : 22       DEVICE TYPE   : 12
  PRODUCT CODE: 89       SERIAL NUMBER : 00E79982
  REVISION    : 1.01
```

This information may be requested when calling for technical support on the product. Values at the bottom of the display are important in determining module operation. The **Program Scan Counter** value is incremented each time a module's program cycle is complete. This value can be used to determine the frequency of program execution by pressing the 'V' key at one-second intervals.

5.7.1.12 W = Warm Boot Module

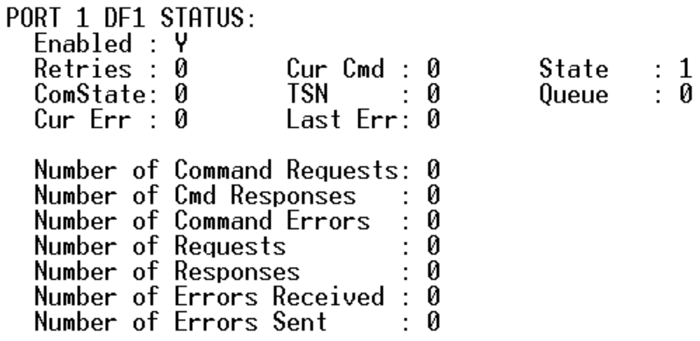
This option is selected when a warm-boot operation is required of the module. After selecting the option, the following will be displayed:



```
Press 'Y' key to confirm warm boot!

Warm booting module....

Reloading Program Values....
Read Configuration....Read commands....
DF1 MASTER/SLAVE COMMUNICATION MODULE (MVI69-DFCM)
(c) 1999-2004, ProSoft Technology, Inc.

         PRODUCT NAME CODE         : DFC6
         SOFTWARE REVISION LEVEL   : 1.41
         OPERATING SYSTEM REVISION : 0604
         RUN NUMBER                : 0901

Press ? for menu help.
```

5.7.1.13 1 and 2 = Communication Status (Ports 1 and 2)

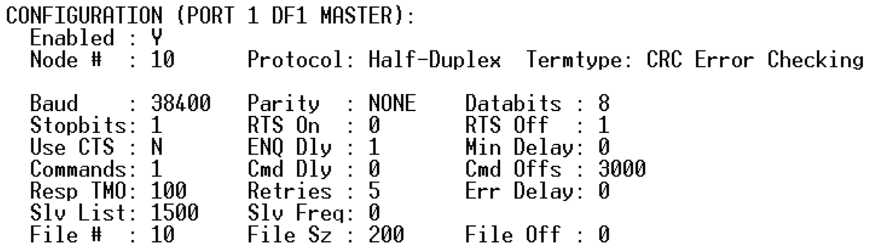
These options are used to display the communication status and statistics of the specified port. This information can be informative when trouble-shooting network problems. After selecting the option, the following information will be displayed:



```
PORT 1 DF1 STATUS:
  Enabled : Y
  Retries : 0      Cur Cmd : 0      State   : 1
  ComState: 0      TSN     : 0      Queue   : 0
  Cur Err : 0      Last Err: 0

  Number of Command Requests: 0
  Number of Cmd Responses   : 0
  Number of Command Errors  : 0
  Number of Requests        : 0
  Number of Responses       : 0
  Number of Errors Received : 0
  Number of Errors Sent     : 0
```

5.7.1.14 6 and 7 = Port Configuration (Ports 1 and 2)

These options are used to display the configuration information for the selected port. After selecting the option, the following information will be displayed:



```
CONFIGURATION (PORT 1 DF1 MASTER):
  Enabled : Y
  Node #  : 10      Protocol: Half-Duplex  Termtype: CRC Error Checking

  Baud    : 38400   Parity  : NONE    Databits : 8
  Stopbits: 1       RTS On  : 0       RTS Off  : 1
  Use CTS : N       ENQ Dly : 1       Min Delay: 0
  Commands: 1       Cmd Dly : 0       Cmd Offs : 3000
  Resp TMO: 100     Retries : 5       Err Delay: 0
  Slv List: 1500    Slv Freq: 0
  File #  : 10      File Sz : 200     File Off : 0
```

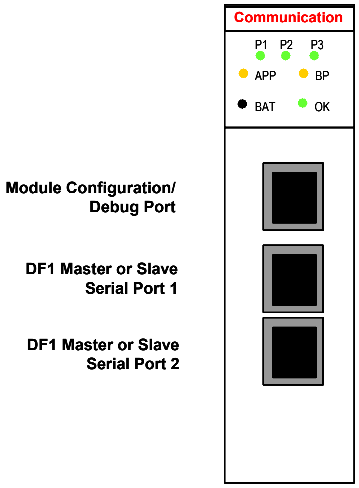
5.7.1.15 Esc = Exit Program

This option is used to exit the program and to display the operating system prompt. This option should only be selected if instructed by the ProSoft Technical Support Group. If you select the option, the module will cease operation. Data will no longer be transferred between the ports and the module and between the CompactLogix processor and the module. This might cause an upset to a currently running process.

6 Cable Connections

The MVI69-DFCM module has the following communication connections on the module:

- Two DF1 communication ports (RJ45 connector)
- One RS-232 Configuration/Debug port (RJ45 connector)


Communication
P1
P2
P3
APP
BP
BAT
OK
Module Configuration/ Debug Port
DF1 Master or Slave Serial Port 1
DF1 Master or Slave Serial Port 2

6.1 DF1 Communication Ports

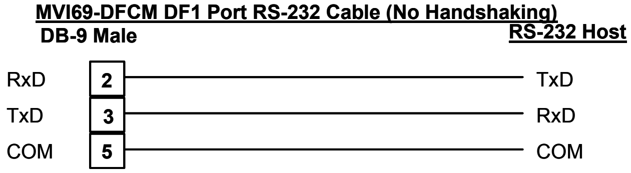
The MVI69-DFCM module has two physical DF1 connectors with a RJ45 plug located on the front of the module.

6.1.1 Connecting the Cable to the Connector

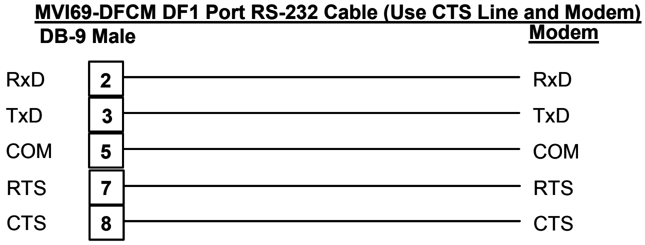
ProSoft provides two RJ45 to male DB-9 pigtails to permit simpler interfacing to other devices. The module's DF1 ports can be configured to operate in RS-232, RS-422 or RS-485 mode. The interface to be associated with a port is set with jumpers on the module. There is a jumper for each of the two ports. Additionally, the use of the modem control lines is user definable. Each interface is described below:

RS-232
When the RS-232 interface is selected, the use of the modem control lines is user definable. If no modem control lines will be used, the cable to connect to the port is as shown below:

MVI69-DFCM DF1 Port RS-232 Cable (No Handshaking)

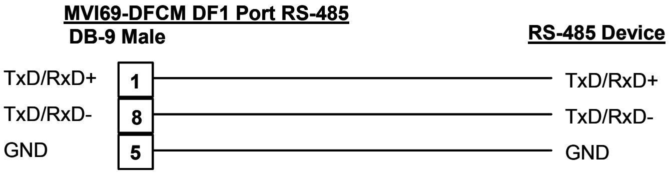


The RTS line is controlled by the RTS on and off parameters set for the port. If the CTS line is used (usually only required for half-duplex modems), the RTS and CTS lines must either be connected together or connected to the modem. The diagram below displays the cable required when connecting the port to a modem.



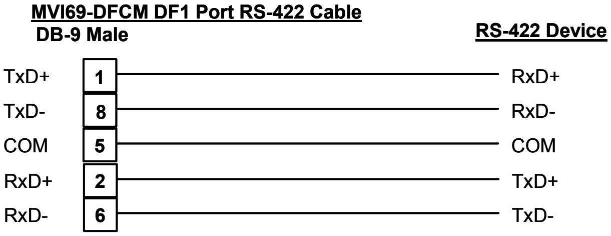
RS-485

When the RS-485 interface is used, a single two or three wire cable is required. The use of the ground is optional and dependent on the RS-485 network. The cable required for this interface is shown below:



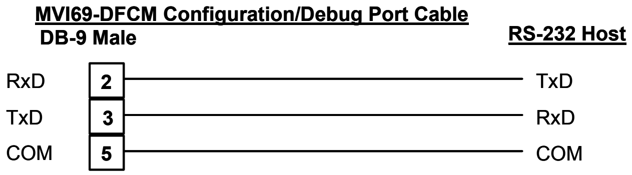
RS-422

When the RS-422 interface is used, a four or five wire cable is required. The use of the ground is optional and dependent on the RS-422 network. The cable required for this interface is shown below:



6.2 RS-232 Configuration/Debug Port

This port is physically a RJ-45 connection. A RJ-45 to DB-9 pigtail cable is shipped with the module. This port permits a PC based terminal emulation program to view configuration and status data in the module and to control the module. The cable for communications on this port is shown below:



Appendix A – DFCM Database Definition

This appendix contains a listing of the internal database of the MVI69-DFCM module. This information can be used to interface other devices to the data contained in the module.

Register Range	Content	Size
0 – 4999	User Data	5000
5000 – 5009	Backplane Configuration	10
5010 – 5039	Port 1 Setup	30
5040 – 5069	Port 2 Setup	30
5070 – 5199	Reserved	130
5200 – 6399	Port 1 Commands	1200
6400 – 7599	Port 2 Commands	1200
7600 – 7700	Misc. Status Data	200
7800 – 7999	Command Control	200
8000 – 9999	Reserved	2000

The User Data area is used to hold data collected from other nodes on the network (master read commands) or data received from the processor (write blocks). Additionally, this data area is used as a data source for the processor (read blocks) or other nodes on the network (write commands).

Detailed definition of the miscellaneous status data area can be found in Appendix B.

Definition of the configuration data areas can be found in the data definition section of this document and in Appendix C.

Appendix D contains a discussion of the command control section of the database.

Appendix B – Status Data Definition

This appendix contains a description of the members present in the **DFCMStatus** object. This data is transferred from the module to the processor as part of each read block.

Status Data Block Structure

Offset	Content	Description
7600	Program Scan Count	This value is incremented each time a complete program cycle occurs in the module.
7601-7602	Product Code	These two registers contain the product code of "DFCM"
7603-7604	Product Version	These two registers contain the product version for the current running software.
7605-7606	Operating System	These two registers contain the month and year values for the program operatin system.
7607-7608	Run Number	These two registers contain the run number value for the currently running software.
7609	Port 1 Command List Requests	This field contains the number of requests made from this port to slave devices on the network.
7610	Port 1 Command List Response	This field contains the number of slave response messages received on the port.
7611	Port 1 Command List Errors	This field contains the number of command errors processed on the port. These errors could be due to a bad response or command.
7612	Port 1 Requests	This field contains the total number of messages sent out of the port.
7613	Port 1 Responses	This field contains the total number of messages received on the port.
7614	Port 1 Errors Sent	This field contains the total number of message errors sent out of the port.
7615	Port 1 Errors Received	This field contains the total number of message errors received on the port.
7616	Port 2 Command List Requests	This field contains the number of requests made from this port to slave devices on the network.
7617	Port 2 Command List Response	This field contains the number of slave response messages received on the port.
7618	Port 2 Command List Errors	This field contains the number of command errors processed on the port. These errors could be due to a bad response or command.

7619	Port 2 Requests	This field contains the total number of messages sent out the port.
7620	Port 2 Responses	This field contains the total number of messages received on the port.
7621	Port 2 Errors Sent	This field contains the total number of message errors sent out of the port.
7622	Port 2 Errors Received	This field contains the total number of message errors received on the port.
7623	Read Block Count	This field contains the total number of read blocks transferred from the module to the processor.
7624	Write Block Count	This field contains the total number of write blocks transferred from the processor to the module.
7625	Parse Block Count	This field contains the total number of blocks successfully parsed that were received from the processor.
7626	Command Event Block Count	This field contains the total number of command event blocks received from the processor.
7627	Command Block Count	This field contains the total number of command blocks received from the processor.
7628	Error Block Count	This field contains the total number of block errors recognized by the module.
7629	Port 1 Current Error	For a slave port, this field contains the value of the current error code returned. For a master port, this field contains the index of the currently executing command.
7630	Port 1 Last Error	For a slave port, this field contains the value of the last error code returned. For a master port, this field contains the index of the command with an error.
7631	Port 2 Current Error	For a slave port, this field contains the value of the current error code returned. For a master port, this field contains the index of the currently executing command.
7632	Port 2 Last Error	For a slave port, this field contains the value of the last error code returned. For a master port, this field contains the index of the command with an error.

Appendix C – Configuration Data Definition

This appendix contains listings of the MVI69-DFCM module's database that are related to the module's configuration. This data is available to any node on the network and is read from the CompactLogix processor when the module first initializes. Additionally, this appendix contains the miscellaneous status data and command control database layout.

Refer to this appendix for information about the configuration file parameters.

Configuration Data Definition

Group	Register	Content	Description
Backplane Setup	5000	Write Start Reg	This parameter specifies the starting register in the module where the data transferred from the processor will be placed. Valid range for this parameter is 0 to 4999.
	5001	Write Reg Count	This parameter specifies the number of registers to transfer from the processor to the module. Valid entry for this parameter is 0 to 5000.
	5002	Read Start Reg	This parameter specifies the starting register in the module where data will be transferred from the module to the processor. Valid range for this parameter is 0 to 4999.
	5003	Read Reg Count	This parameter specifies the number of registers to be transferred from the module to the processor. Valid entry for this parameter is 0 to 5000.
	5004	Backplane Fail	This parameter specifies the number of successive transfer errors that must occur before the communication ports are shut down. If the parameter is set to 0, the communication ports will continue to operate under all conditions. If the value is set larger than 0 (1-65535), communications will cease if the specified number of failures occur.
	5005	Error Status Pointer	This parameter specifies the register location in the module's database where module status data will be stored. If a value less than 0 is entered, the data will not be stored in the database. If the value specified is in the range of 0 to 4940, the data will be placed in the user data area.
	5006	BT Size	This parameter defines the size of the block transfer data area for the application. Valid values are 60, 120 and 240.
	5007	Spare	
	5008	Spare	
	5009	Spare	

Group	Register	Content	Description
Port 1 Setup	5010	Enable	This parameter is used to define if this port will be utilized. If the parameter is set to 0, the port is disabled. A value of 1 will enable the port.
	5011	Type	This parameter defines if the port will emulate a master or slave device. Enter 0 to emulate a master device and 1 to emulate a slave device.
	5012	Local Station ID	This parameter specifies the local station ID for all DF1 messages sent from this master port. A value of 255 is not permitted as this is the broadcast address. Enter a value in the range of 0 to 254.
	5013	Protocol	0=full duplex, 1=half-duplex
	5014	Termination Type	This parameter specifies the error checking for all DF1 messages. 0=BCC, 1=CRC
	5015	Baud Rate	This is the baud rate to be used on the port. Enter the baud rate as a value. For example, to select 19K baud, enter 19200.
	5016	Parity	This is the Parity code to be used for the port. The coded values are as follows: 0=None, 1=Odd, 2=Even, 3=Mark and 4=Space.
	5017	Data Bits	This parameter sets the number of data bits for each word used by the protocol. Enter a value in the range of 5 to 8.
	5018	Stop Bits	This parameter sets the number of stop bits to be used with each data value sent. Enter a value of 1 or 2.
	5019	Minimum Response Delay	This parameter sets the number of milliseconds to wait before a response message is sent out of the port. This parameter is required when interfacing to a slow responding device. Enter a value in the range of 0 to 65535.
	5020	RTS On Delay	This parameter sets the number of milliseconds to delay after RTS is asserted before the data will be transmitted. Enter a value in the range of 0 to 65535.
	5021	RTS Off Delay	This parameter sets the number of milliseconds to delay after the last byte of data is sent before the RTS modem signal will be set low. Enter a value in the range of 0 to 65535.
	5022	Use CTS Line	This parameter specifies if the CTS modem control line is to be used. If the parameter is set to 0, the CTS line will not be monitored. If the parameter is set to 1, the CTS line will be monitored and must be high before the module will send data. Normally, this parameter is required when half-duplex modems are used for communication (2-wire).

5023	ENQ Delay	This parameter specifies the number of milliseconds to wait after a DLE-ACK is received from a slave using half-duplex mode before the DLE-ENQ request is made for data. Enter a value in the range of 0 to 65535.
5024	Command Count	This parameter specifies the number of commands to be processed for the port. Enter a value of 0 to 100.
5025	Minimum Command Delay	This parameter specifies the number of milliseconds to wait between the initial issuance of a command. This parameter can be used to delay all commands sent to slaves to avoid "flooding" commands on the network. This parameter does not affect retries of a command as they will be issued when failure is recognized. Enter a value in the range of 0 to 65535.
5026	Command Error Pointer	This parameter sets the address in the internal Modbus database where the command error data will be placed. If the value is set to -1, the data will not be transferred to the database. Enter a value of 0 to 4999.
5027	Response Timeout	This parameter represents the message response timeout period in 1-ms increments. This is the time that a port configured as a master will wait before re-transmitting a command if no response is received from the addressed slave. The value is set depending upon the communication network used and the expected response time of the slowest device on the network.
5028	Retry Count	This parameter specifies the number of times a command will be retried if it fails. Enter a value in the range of 0 to 10.
5029	Error Delay Count	This parameter specifies the number of polls to be skipped on the slave before trying to re-establish communications. After the slave fails to respond, the master will skip commands to be sent to the slave the number of times entered in this parameter. Enter a value in the range of 0 to 65535.
5030	Slave List Pointer	This parameter specifies the starting address in the virtual database where the 256 slave status values will be written. If the parameter is set to -1, the slave data will not be placed in the database. Enter a value in the range of -1 to 4743.
5031	Slave List Frequency	This parameter specifies the number of program cycles to delay before updating the slave list data in the virtual database. If the parameter is set to 0, the data will not be placed in the database. Enter a value in the range of 0 to 65535.

	5032	First File	This parameter is used when a request for a file is received on the communication port. This field is required when responding to PLC5 and SLC DF1 commands. Use this parameter to define the virtual file(s) to be simulated on the module. Enter a value in the range of 0 to 100.
	5033	File Size	This parameter is used to specify the size of each file to be simulated on the module. All files simulated are defined to have the same assigned size. Enter a value in the range of 0 to 1000.
	5034	File Offset	This parameter sets the database register location of the first element in the first file simulated in the module. All offsets in the first file and subsequent files will be computed using the address specified. Enter a value in the range of 0 to 4999.
	5035	File Map Count	This parameter specifies the number of specific emulated file maps that are defined for the port. The range of this parameter is 0 to 50. This parameter limits the number of map file configuration read for the port.
	5036	Spare	
	5037	Spare	
	5038	Spare	
	5039	Spare	

Group	Register	Content	Description
Port 2 Setup	5040	Enable	This parameter is used to define if this port will be utilized. If the parameter is set to 0, the port is disabled. A value of 1 will enable the port.
	5041	Type	This parameter defines if the port will emulate a master or slave device. Enter 0 to emulate a master device and 1 to emulate a slave device.
	5042	Local Station ID	This parameter specifies the local station ID for all DF1 messages sent from this master port. A value of 255 is not permitted as this is the broadcast address. Enter a value in the range of 0 to 254.
	5043	Protocol	0=full duplex, 1=half-duplex
	5044	Termination Type	This parameter specifies the error checking for all DF1 messages. 0=BCC, 1=CRC
	5045	Baud Rate	This is the baud rate to be used on the port. Enter the baud rate as a value. For example, to select 19K baud, enter 19200.
	5046	Parity	This is the Parity code to be used for the port. The coded values are as follows: 0=None, 1=Odd, 2=Even, 3=Mark and 4=Space.
	5047	Data Bits	This parameter sets the number of data bits for each word used by the protocol. Enter a value in the range of 5 to 8.

5048	Stop Bits	This parameter sets the number of stop bits to be used with each data value sent. Enter a value of 1 or 2.
5049	Minimum Response Delay	This parameter sets the number of milliseconds to wait before a response message is sent out of the port. This parameter is required when interfacing to a slow responding device. Enter a value in the range of 0 to 65535.
5050	RTS On Delay	This parameter sets the number of milliseconds to delay after RTS is asserted before the data will be transmitted. Enter a value in the range of 0 to 65535.
5051	RTS Off Delay	This parameter sets the number of milliseconds to delay after the last byte of data is sent before the RTS modem signal will be set low. Enter a value in the range of 0 to 65535.
5052	Use CTS Line	This parameter specifies if the CTS modem control line is to be used. If the parameter is set to 0, the CTS line will not be monitored. If the parameter is set to 1, the CTS line will be monitored and must be high before the module will send data. Normally, this parameter is required when half-duplex modems are used for communication (2-wire).
5053	ENQ Delay	This parameter specifies the number of milliseconds to wait after a DLE-ACK is received from a slave using half-duplex mode before the DLE-ENQ request is made for data. Enter a value in the range of 0 to 65535.
5054	Command Count	This parameter specifies the number of commands to be processed for the port. Enter a value of 0 to 100.
5055	Minimum Command Delay	This parameter specifies the number of milliseconds to wait between the initial issuance of a command. This parameter can be used to delay all commands sent to slaves to avoid "flooding" commands on the network. This parameter does not affect retries of a command as they will be issued when failure is recognized. Enter a value in the range of 0 to 65535.
5056	Command Error Pointer	This parameter sets the address in the internal Modbus database where the command error data will be placed. If the value is set to -1, the data will not be transferred to the database. Enter a value of 0 to 4999.
5057	Response Timeout	This parameter represents the message response timeout period in 1-ms increments. This is the time that a port configured as a master will wait before re-transmitting a command if no response is received from the addressed slave. The value is set depending upon the communication network used and the expected response time of the slowest device on the network.

	5058	Retry Count	This parameter specifies the number of times a command will be retried if it fails. Enter a value in the range of 0 to 10.
	5059	Error Delay Count	This parameter specifies the number of polls to be skipped on the slave before trying to re-establish communications. After the slave fails to respond, the master will skip commands to be sent to the slave the number of times entered in this parameter. Enter a value in the range of 0 to 65535.
	5060	Slave List Pointer	This parameter specifies the starting address in the virtual database where the 256 slave status values will be written. If the parameter is set to -1, the slave data will not be placed in the database. Enter a value in the range of -1 to 4743.
	5061	Slave List Frequency	This parameter specifies the number of program cycles to delay before updating the slave list data in the virtual database. If the parameter is set to 0, the data will not be placed in the database. Enter a value in the range of 0 to 65535.
	5062	First File	This parameter is used when a request for a file is received on the communication port. This field is required when responding to PLC5 and SLC DF1 commands. Use this parameter to define the virtual file(s) to be simulated on the module. Enter a value in the range of 0 to 100.
	5063	File Size	This parameter is used to specify the size of each file to be simulated on the module. All files simulated are defined to have the same assigned size. Enter a value in the range of 0 to 1000.
	5064	File Offset	This parameter sets the database register location of the first element in the first file simulated in the module. All offsets in the first file and subsequent files will be computed using the address specified. Enter a value in the range of 0 to 4999.
	5065	File Map Count	This parameter specifies the number of specific emulated file maps that are defined for the port. The range of this parameter is 0 to 50. This parameter limits the number of map file configuration read for the port.
	5066	Spare	
	5067	Spare	
	5068	Spare	
	5069	Spare	

Group	Register	Content	Description
Port 1 Commands	5200-5211	Command # 1	This set of registers contains the parameters for the first command in the master command list. The structure of this data area is as described in the data object section of the documentation.
	5212-5223	Command # 2	Command #2 data set
	-		
	6388-6399	Command # 100	Command #100 data set

Group	Register	Content	Description
Port 2 Commands	6400-6411	Command # 1	This set of registers contains the parameters for the first command in the master command list. The structure of this data area is as described in the data object section of the documentation.
	6412-6423	Command # 2	Command #2 data set
	-		
	7588-7599	Command # 100	Command #100 data set

Group	Register	Content	Description
Misc. Status	7600	Program Scan Count	This value is incremented each time a complete program cycle occurs in the module.
	7601	Product Code	These two registers contain the product code of
	7602		"DFCM"
	7603	Product Version	These two registers contain the product version for
	7604		the currently running software.
	7605	Operating System	These two registers contain the month and year values
	7606		for the program operating system.
	7607	Run Number	These two registers contain the run number value for
	7608		the currently running software.
	7609	Port 1 Command List Requests	This field contains the number of requests made from this port to slave devices on the network.
	7610	Port 1 Command List Response	This field contains the number of slave response messages received on the port.
	7611	Port 1 Command List Errors	This field contains the number of command errors processed on the port. These errors could be due to a bad response or command.
	7612	Port 1 Requests	This field contains the total number of messages sent out the port.
	7613	Port 1 Responses	This field contains the total number of messages received on the port.

	7614	Port 1 Errors Sent	This field contains the total number of message errors sent out the port.
	7615	Port 1 Errors Received	This field contains the total number of message errors received on the port.
	7616	Port 2 Command List Requests	This field contains the number of requests made from this port to slave devices on the network.
	7617	Port 2 Command List Response	This field contains the number of slave response messages received on the port.
	7618	Port 2 Command List Errors	This field contains the number of command errors processed on the port. These errors could be due to a bad response or command.
	7619	Port 2 Requests	This field contains the total number of messages sent out the port.
	7620	Port 2 Responses	This field contains the total number of messages received on the port.
	7621	Port 2 Errors Sent	This field contains the total number of message errors sent out the port.
	7622	Port 2 Errors Received	This field contains the total number of message errors received on the port.
	7623	Read Block Count	This field contains the total number of read blocks transferred from the module to the processor.
	7624	Write Block Count	This field contains the total number of write blocks transferred from the processor to the module.
	7625	Parse Block Count	This field contains the total number of blocks successfully parsed that were received from the processor.
	7626	Command Event Block Count	This field contains the total number of command event blocks received from the processor.
	7627	Command Block Count	This field contains the total number of command blocks received from the processor.
	7628	Error Block Count	This field contains the total number of block errors recognized by the module.
	7629	Port 1 Current Error/Index	For a slave port, this field contains the value of the current error code returned. For a master port, this field contains the index of the currently executing command.
	7630	Port 1 Last Error/Index	For a slave port, this field contains the value of the last error code returned. For a master port, this field contains the index of the command with an error.
	7631	Port 2 Current Error/Index	For a slave port, this field contains the value of the current error code returned. For a master port, this field contains the index of the currently executing command.
	7632	Port 2 Last Error/Index	For a slave port, this field contains the value of the last error code returned. For a master port, this field contains the index of the command with an error.

Group	**Register**	**Content**	**Description**
Command Control	7800	Command Code	Enter one of the valid control command codes in this register to control the module (9997, 9998 or 9999). Refer to Appendix D for more information.
	7801	Command Data	Reserved for future use
	-	-	
	7999	Command Data	Reserved for future use

Group	**Register**	**Content**	**Description**
Port 1 Override File Maps	8000-8003	File Map #1	This set of registers contains the first override file map for the slave port.
	8004-8007	File Map #2	This set of registers contains the second override file map for the slave port.
	-		
	8196-8199	Command # 50	This set of registers contains the last override file map for the slave port.

Group	**Register**	**Content**	**Description**
Port 2 Override File Maps	8200-8203	File Map #1	This set of registers contains the first override file map for the slave port.
	8204-8207	File Map #2	This set of registers contains the second override file map for the slave port.
	-		
	8396-8399	Command # 50	This set of registers contains the last override file map for the slave port.

Appendix D – DFCM Command Control

Command Control data is received from other nodes on the network that can control the MVI69-DFCM module. Specific values are written to regions of this block to control the module. Currently, the module is programmed to handle the receipt of the following requests: warm boot and cold boot.

The remote node controls the module by writing one of the following values to register 7800:

9998	Warm boot the module
9999	Cold boot the module

Appendix E – Command Error List Values

COMMAND ERROR LIST VALUES

LOCAL STS ERROR CODES	
0x0000	Success, no error
0x0100	DST node is out of buffer space
0x0200	Cannot guarantee delivery (Link Layer)
0x0300	Duplicate token holder detected
0x0400	Local port is disconnected
0x0500	Application layer timed out waiting for response
0x0600	Duplicate node detected
0x0700	Station is offline
0x0800	Hardware fault

REMOTE STS ERROR CODES	
0x0000	Success, no error
0x1000	Illegal command or format
0x2000	Host has a problem and will not communicate
0x3000	Remote node host is missing, disconnected or shut down
0x4000	Host could not complete function due to hardware fault
0x5000	Addressing problem or memory protect rungs
0x6000	Function not allowed due to command protection selection
0x7000	Processor is in Program mode
0x8000	Compatibility mode file missing or communication zone problem
0x9000	Remote node cannot buffer command
0xA000	Wait ACK (1775-KA buffer full)
0xB000	Remote node problem due to download
0xC000	Wait ACK (1775-KA buffer full)
0xD000	Not used
0xE000	Not used
0xF0nn	Error code in the EXT STS byte (nn contains EXT error code)

ERRORS WHEN ETX STS IS PRESENT	
0xF000	Not used
0xF001	A field has an illegal value
0xF002	Less levels specified in address than minimum for any address
0xF003	More levels specified in address than system supports
0xF004	Symbol not found
0xF005	Symbol is of improper format
0xF006	Address does not point to something usable
0xF007	File is wrong size
0xF008	Cannot complete request
0xF009	Data or file is too large
0xF00A	Transaction size plus word address is too large

0xF00B	Access denied, improper privilege
0xF00C	Condition cannot be generated - resource is not available
0xF00D	Condition already exists - resource is already available
0xF00E	Command cannot be executed
0xF00F	Histogram overflow
0xF010	No access
0xF011	Illegal data type
0xF012	Invalid parameter or invalid data
0xF013	Address reference exists to deleted area
0xF014	Command execution failure for unknown reason
0xF015	Data conversion error
0xF016	Scanner not able to communicate with 1771 rack adapter
0xF017	Type mismatch
0xF018	1171 module response was not valid
0xF019	Duplicate label
0xF01A	File is open; another node owns it
0xF01B	Another node is the program owner
0xF01C	Reserved
0xF01D	Reserved
0xF01E	Data table element protection violation
0xF01F	Temporary internal problem

MODULE SPECIFIC ERROR (NOT DF1 COMPLIANT)	
0xFFFF	CTS modem control line not set before transmit
0xFFFE	Timeout while transmitting message
0xFFF6	Timeout waiting for DLE-ACK after request
0xFFF5	Timeout waiting for response after request
0xFFEC	DLE-NAK received after request
0xFFEB	DLE-NAK sent after response

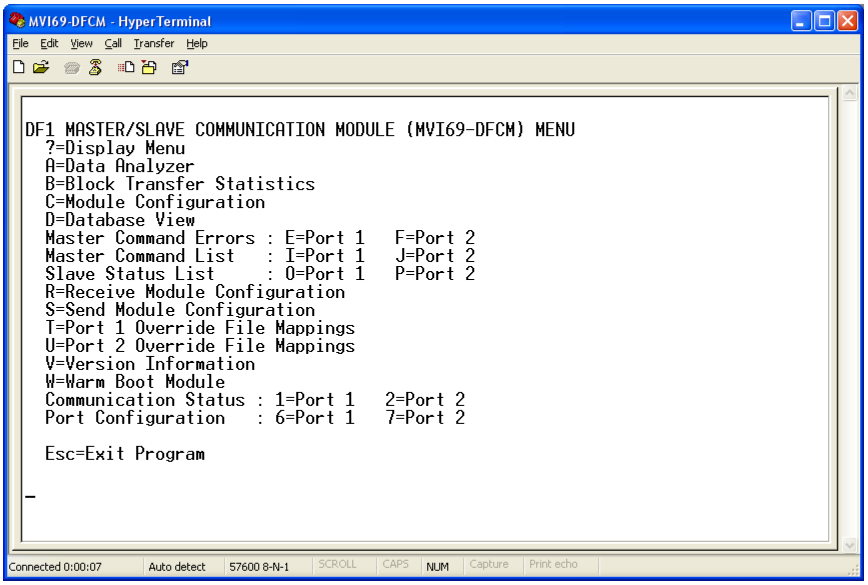
Appendix F - Uploading and Downloading the Configuration File

ProSoft modules are shipped with a pre-loaded configuration file. In order to edit this file, you must download the file from the module to your PC. After editing, you must upload the file back to the module.

This appendix describes these procedures.

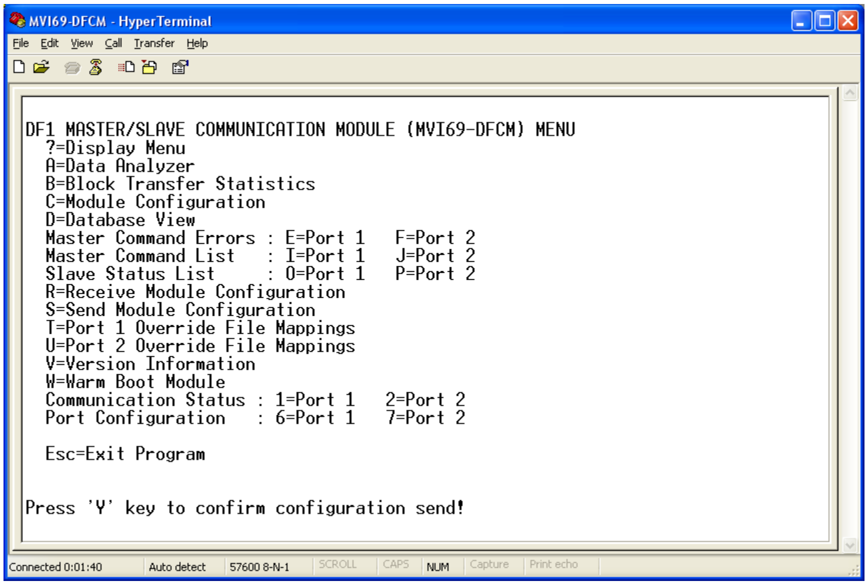
Download a Configuration File to Your PC

1. Connect your PC to the Configuration/Debug port of the module and access the DF1 Master/Slave Communication Module Menu using HyperTerminal or similar program.



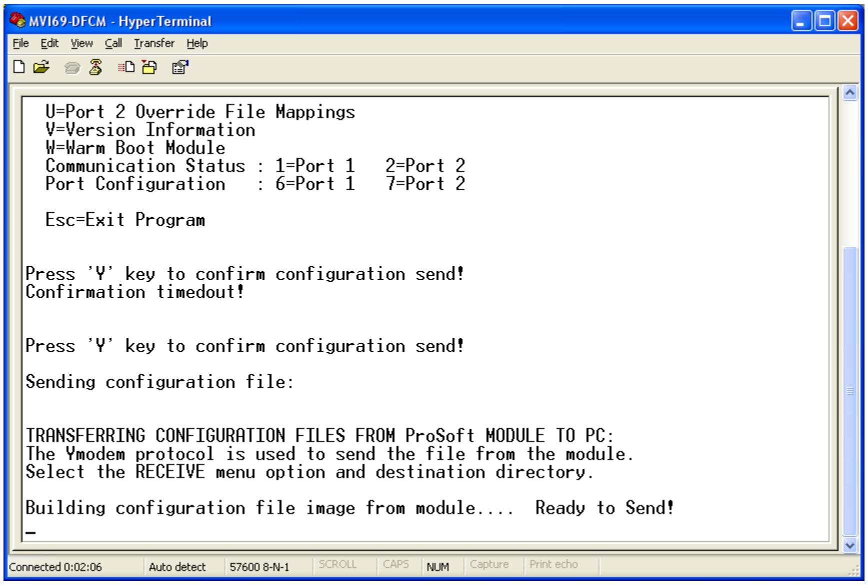
```
DF1 MASTER/SLAVE COMMUNICATION MODULE (MVI69-DFCM) MENU
  ?=Display Menu
  A=Data Analyzer
  B=Block Transfer Statistics
  C=Module Configuration
  D=Database View
  Master Command Errors : E=Port 1   F=Port 2
  Master Command List   : I=Port 1   J=Port 2
  Slave Status List     : O=Port 1   P=Port 2
  R=Receive Module Configuration
  S=Send Module Configuration
  T=Port 1 Override File Mappings
  U=Port 2 Override File Mappings
  V=Version Information
  W=Warm Boot Module
  Communication Status : 1=Port 1   2=Port 2
  Port Configuration   : 6=Port 1   7=Port 2

  Esc=Exit Program

_
```

2. Press the S key (Send Module Configuration). The message “Press Y key to confirm configuration send!” is displayed at the bottom of the screen.



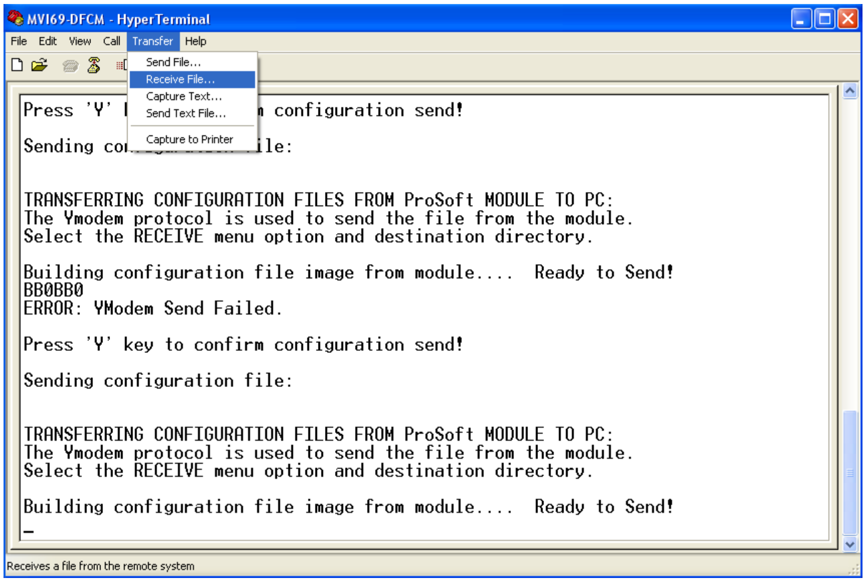
```
DF1 MASTER/SLAVE COMMUNICATION MODULE (MVI69-DFCM) MENU
  ?=Display Menu
  A=Data Analyzer
  B=Block Transfer Statistics
  C=Module Configuration
  D=Database View
  Master Command Errors : E=Port 1   F=Port 2
  Master Command List   : I=Port 1   J=Port 2
  Slave Status List     : O=Port 1   P=Port 2
  R=Receive Module Configuration
  S=Send Module Configuration
  T=Port 1 Override File Mappings
  U=Port 2 Override File Mappings
  V=Version Information
  W=Warm Boot Module
  Communication Status : 1=Port 1   2=Port 2
  Port Configuration   : 6=Port 1   7=Port 2

  Esc=Exit Program


Press 'Y' key to confirm configuration send!
```

3. Press Y. The screen now indicates that the module is ready to send.



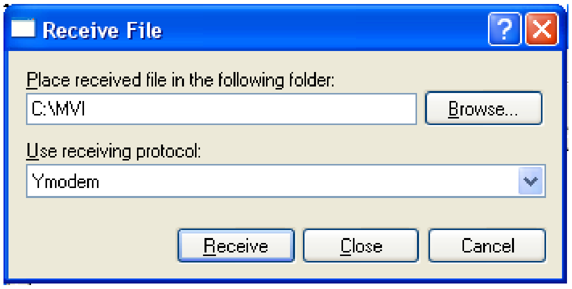
```
  U=Port 2 Override File Mappings
  V=Version Information
  W=Warm Boot Module
  Communication Status : 1=Port 1   2=Port 2
  Port Configuration   : 6=Port 1   7=Port 2

  Esc=Exit Program


Press 'Y' key to confirm configuration send!
Confirmation timedout!


Press 'Y' key to confirm configuration send!

Sending configuration file:


TRANSFERRING CONFIGURATION FILES FROM ProSoft MODULE TO PC:
The Ymodem protocol is used to send the file from the module.
Select the RECEIVE menu option and destination directory.

Building configuration file image from module....  Ready to Send!
_
```

4. From the **Transfer** menu, select **Receive File**.


MVI69-DFCM - HyperTerminal
File Edit View Call Transfer Help
Send File...
Receive File...
Capture Text...
Send Text File...
Capture to Printer
Receives a file from the remote system

```
Press 'Y'             n configuration send!

Sending co           ile:


TRANSFERRING CONFIGURATION FILES FROM ProSoft MODULE TO PC:
The Ymodem protocol is used to send the file from the module.
Select the RECEIVE menu option and destination directory.

Building configuration file image from module....  Ready to Send!
BB0BB0
ERROR: YModem Send Failed.

Press 'Y' key to confirm configuration send!

Sending configuration file:


TRANSFERRING CONFIGURATION FILES FROM ProSoft MODULE TO PC:
The Ymodem protocol is used to send the file from the module.
Select the RECEIVE menu option and destination directory.

Building configuration file image from module....  Ready to Send!
_
```

The Receive File dialog box appears:



Place received file in the following folder: C:\MVI

Use receiving protocol: Ymodem

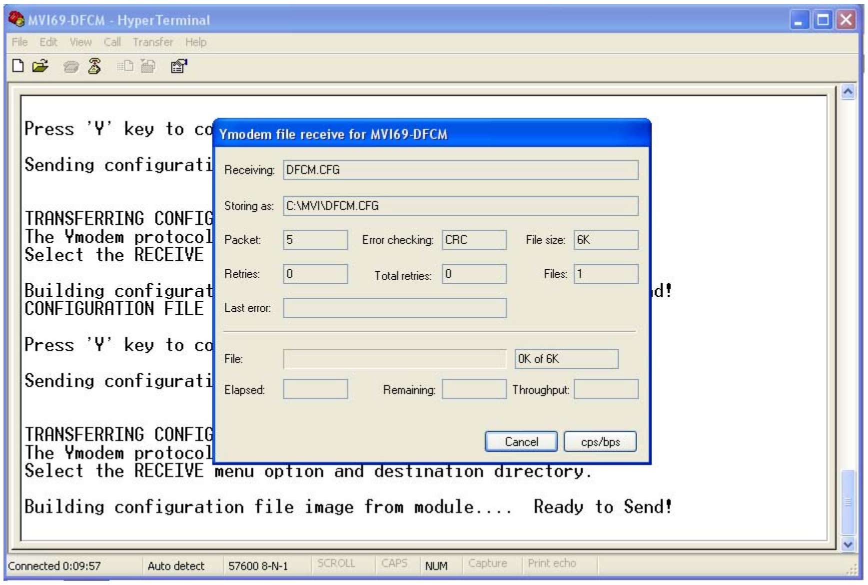
5. Select the location on your PC where you want the configuration file downloaded to.

   Note: ProSoft Technology suggests that you download the configuration file pre-loaded on your module. However, configuration files are also available on the ProSoft CD as well as the ProSoft Technology website.

6. Select Ymodem as the receiving protocol.

7. Press the Receive button.

   The progress screen appears.


MVI69-DFCM - HyperTerminal
File Edit View Call Transfer Help
Ymodem file receive for MVI69-DFCM
Cancel
cps/bps
SCROLL
CAPS
NUM
Capture
Print echo

```
Press 'Y' key to co

Sending configurati


TRANSFERRING CONFIG
The Ymodem protocol
Select the RECEIVE

Building configurat                                      d!
CONFIGURATION FILE

Press 'Y' key to co

Sending configurati


TRANSFERRING CONFIG
The Ymodem protocol
Select the RECEIVE menu option and destination directory.

Building configuration file image from module....  Ready to Send!
```

Receiving: DFCM.CFG

Storing as: C:\MVI\DFCM.CFG

Packet: 5   Error checking: CRC   File size: 6K

Retries: 0   Total retries: 0   Files: 1

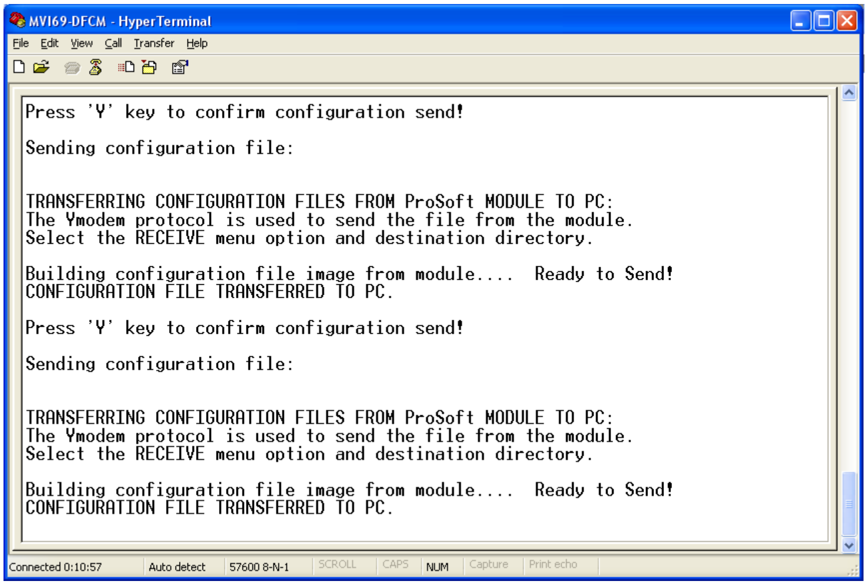
Last error:

File: 0K of 6K

Elapsed: Remaining: Throughput:

Connected 0:09:57   Auto detect   57600 8-N-1

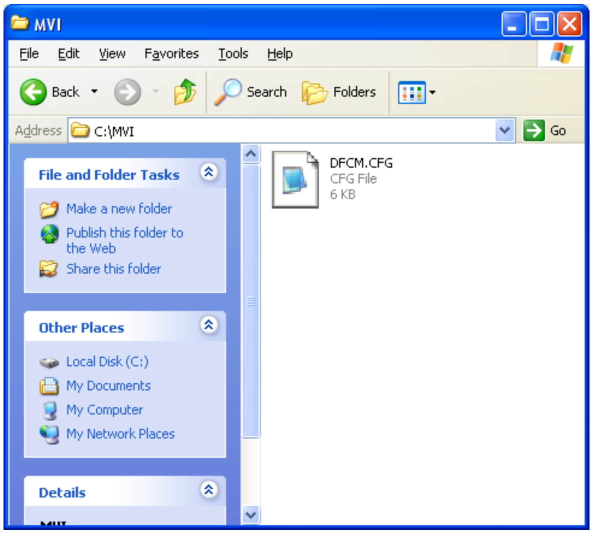
When the configuration file is downloaded to your PC, the screen indicates that the download is complete.



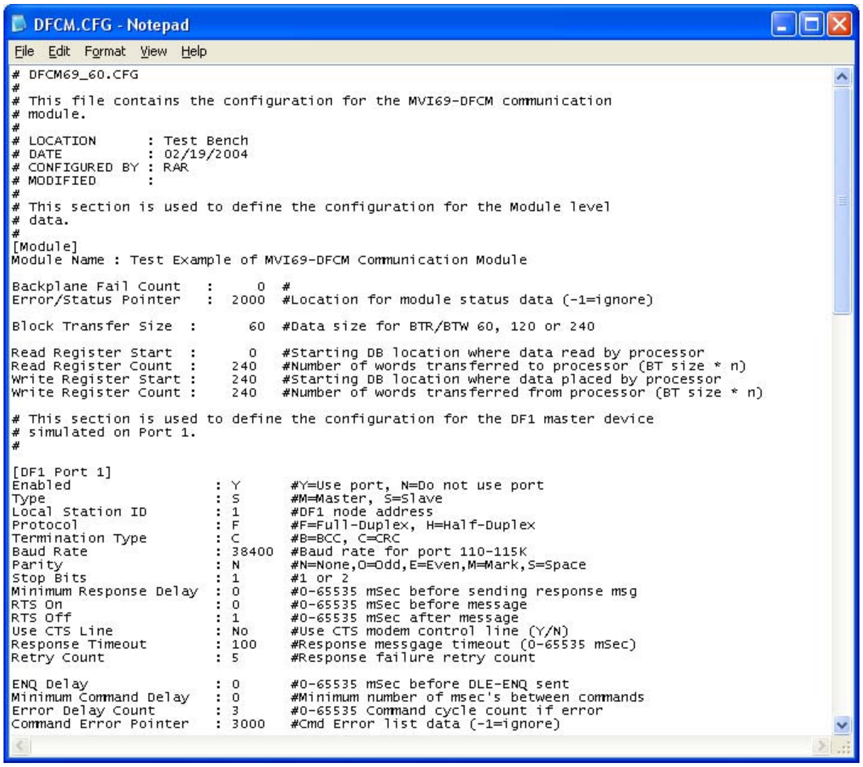
```
Press 'Y' key to confirm configuration send!

Sending configuration file:


TRANSFERRING CONFIGURATION FILES FROM ProSoft MODULE TO PC:
The Ymodem protocol is used to send the file from the module.
Select the RECEIVE menu option and destination directory.

Building configuration file image from module....  Ready to Send!
CONFIGURATION FILE TRANSFERRED TO PC.

Press 'Y' key to confirm configuration send!

Sending configuration file:


TRANSFERRING CONFIGURATION FILES FROM ProSoft MODULE TO PC:
The Ymodem protocol is used to send the file from the module.
Select the RECEIVE menu option and destination directory.

Building configuration file image from module....  Ready to Send!
CONFIGURATION FILE TRANSFERRED TO PC.
```

Connected 0:10:57   Auto detect   57600 8-N-1

The configuration file is now on your PC at the location you specified.



You can now open and edit the file.



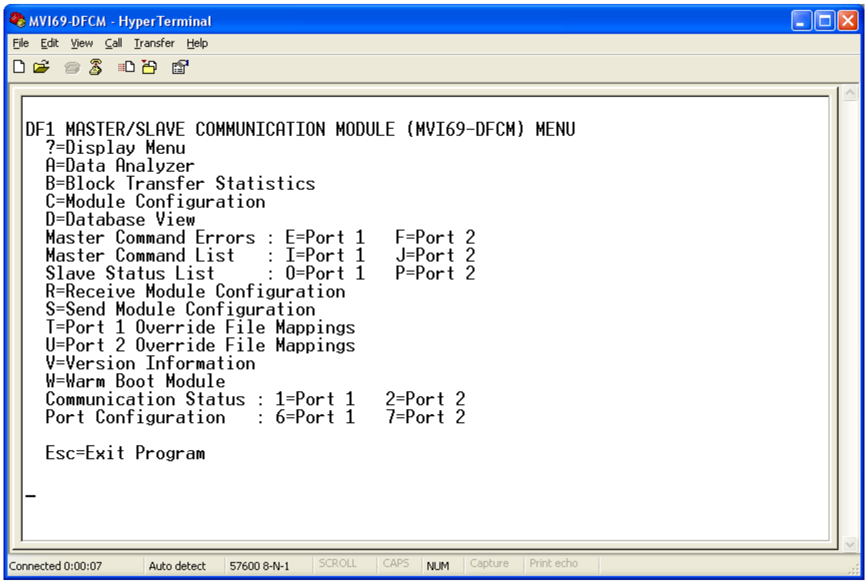
```
# DFCM69_60.CFG
#
# This file contains the configuration for the MVI69-DFCM communication
# module.
#
# LOCATION      : Test Bench
# DATE          : 02/19/2004
# CONFIGURED BY : RAR
# MODIFIED      :
#
# This section is used to define the configuration for the Module level
# data.
#
[Module]
Module Name : Test Example of MVI69-DFCM Communication Module

Backplane Fail Count   :     0  #
Error/Status Pointer   :  2000  #Location for module status data (-1=ignore)

Block Transfer Size  :      60  #Data size for BTR/BTW 60, 120 or 240

Read Register Start  :      0   #Starting DB location where data read by processor
Read Register Count  :    240   #Number of words transferred to processor (BT size * n)
Write Register Start :    240   #Starting DB location where data placed by processor
Write Register Count :    240   #Number of words transferred from processor (BT size * n)

# This section is used to define the configuration for the DF1 master device
# simulated on Port 1.
#

[DF1 Port 1]
Enabled                 : Y      #Y=Use port, N=Do not use port
Type                    : S      #M=Master, S=Slave
Local Station ID        : 1      #DF1 node address
Protocol                : F      #F=Full-Duplex, H=Half-Duplex
Termination Type        : C      #B=BCC, C=CRC
Baud Rate               : 38400  #Baud rate for port 110-115K
Parity                  : N      #N=None,O=Odd,E=Even,M=Mark,S=Space
Stop Bits               : 1      #1 or 2
Minimum Response Delay  : 0      #0-65535 mSec before sending response msg
RTS On                  : 0      #0-65535 mSec before message
RTS Off                 : 1      #0-65535 mSec after message
Use CTS Line            : No     #Use CTS modem control line (Y/N)
Response Timeout        : 100    #Response messgage timeout (0-65535 mSec)
Retry Count             : 5      #Response failure retry count

ENQ Delay               : 0      #0-65535 mSec before DLE-ENQ sent
Minimum Command Delay   : 0      #Minimum number of msec's between commands
Error Delay Count       : 3      #0-65535 Command cycle count if error
Command Error Pointer   : 3000   #Cmd Error list data (-1=ignore)
```

8. Once you are done editing the file. Save and close the file.

Uploading the Configuration File to the Module

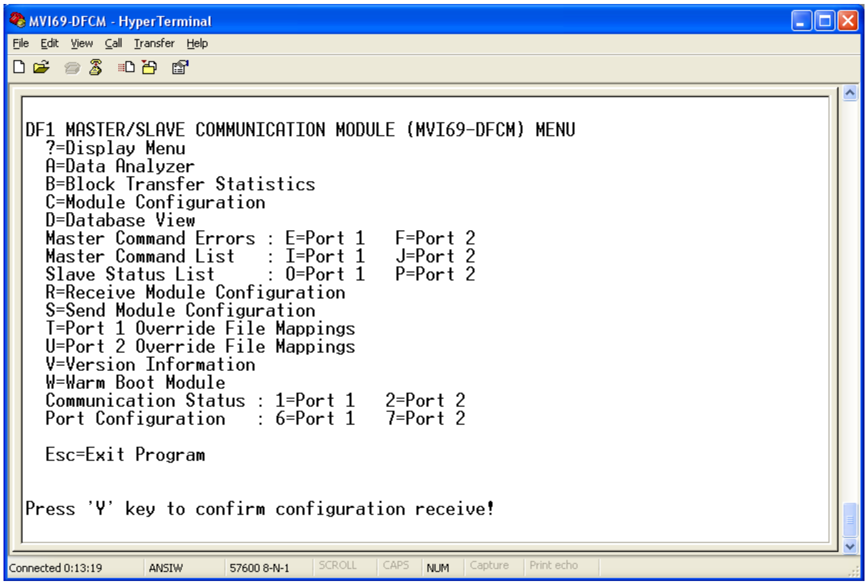
Perform the following steps to upload a configuration file from your PC to the module.

1. If not already connected, Connect your PC to the Configuration/Debug port of the module and access the DF1 Master/Slave Communication Module Menu using HyperTerminal or similar program.



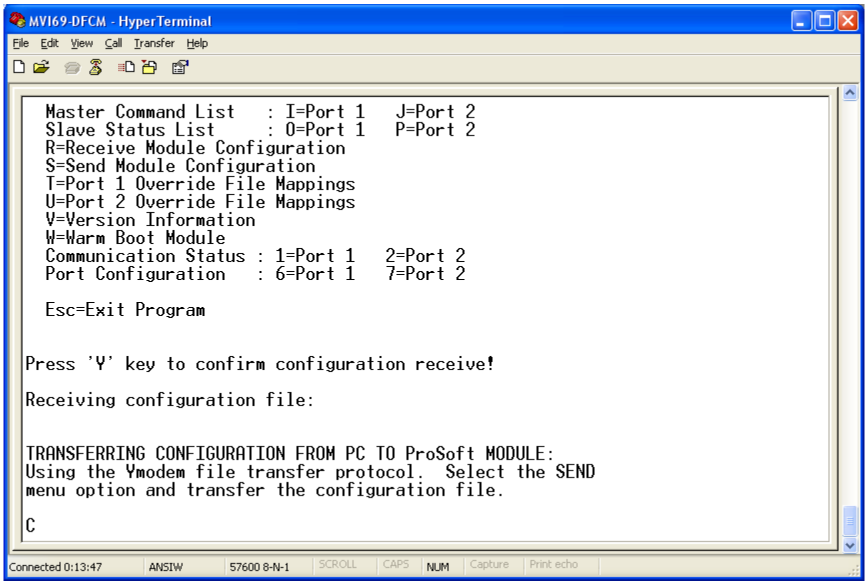
```
DF1 MASTER/SLAVE COMMUNICATION MODULE (MVI69-DFCM) MENU
  ?=Display Menu
  A=Data Analyzer
  B=Block Transfer Statistics
  C=Module Configuration
  D=Database View
  Master Command Errors : E=Port 1   F=Port 2
  Master Command List   : I=Port 1   J=Port 2
  Slave Status List     : O=Port 1   P=Port 2
  R=Receive Module Configuration
  S=Send Module Configuration
  T=Port 1 Override File Mappings
  U=Port 2 Override File Mappings
  V=Version Information
  W=Warm Boot Module
  Communication Status : 1=Port 1   2=Port 2
  Port Configuration   : 6=Port 1   7=Port 2

  Esc=Exit Program

_
```

2. Press the R key (Receive Module Configuration). The message “Press Y key to confirm configuration receive!” is displayed at the bottom of the screen.



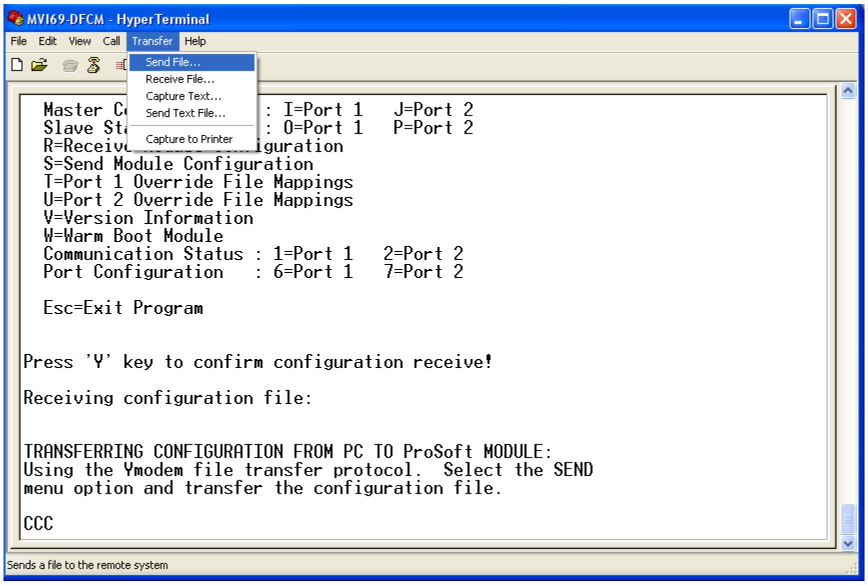
```
DF1 MASTER/SLAVE COMMUNICATION MODULE (MVI69-DFCM) MENU
  ?=Display Menu
  A=Data Analyzer
  B=Block Transfer Statistics
  C=Module Configuration
  D=Database View
  Master Command Errors : E=Port 1   F=Port 2
  Master Command List   : I=Port 1   J=Port 2
  Slave Status List     : O=Port 1   P=Port 2
  R=Receive Module Configuration
  S=Send Module Configuration
  T=Port 1 Override File Mappings
  U=Port 2 Override File Mappings
  V=Version Information
  W=Warm Boot Module
  Communication Status : 1=Port 1   2=Port 2
  Port Configuration   : 6=Port 1   7=Port 2

  Esc=Exit Program


Press 'Y' key to confirm configuration receive!
```

3. Press the Y key. The screen indicates that the PC is ready to send.



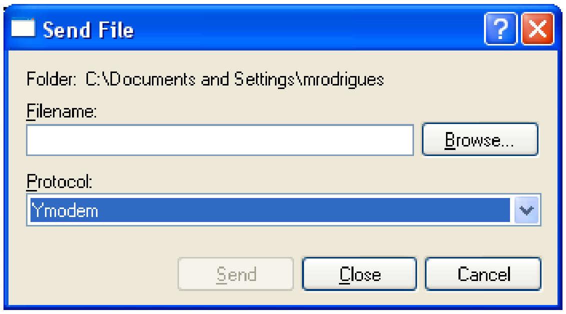
```
  Master Command List   : I=Port 1   J=Port 2
  Slave Status List     : O=Port 1   P=Port 2
  R=Receive Module Configuration
  S=Send Module Configuration
  T=Port 1 Override File Mappings
  U=Port 2 Override File Mappings
  V=Version Information
  W=Warm Boot Module
  Communication Status : 1=Port 1   2=Port 2
  Port Configuration   : 6=Port 1   7=Port 2

  Esc=Exit Program


Press 'Y' key to confirm configuration receive!

Receiving configuration file:


TRANSFERRING CONFIGURATION FROM PC TO ProSoft MODULE:
Using the Ymodem file transfer protocol.  Select the SEND
menu option and transfer the configuration file.

C
```

4. From the **Transfer** menu, select **Send File**.


MVI69-DFCM - HyperTerminal
File Edit View Call Transfer Help
Send File...
Receive File...
Capture Text...
Send Text File...
Capture to Printer
Sends a file to the remote system

```
  Master C            : I=Port 1   J=Port 2
  Slave St            : O=Port 1   P=Port 2
  R=Receiv               iguration
  S=Send Module Configuration
  T=Port 1 Override File Mappings
  U=Port 2 Override File Mappings
  V=Version Information
  W=Warm Boot Module
  Communication Status : 1=Port 1   2=Port 2
  Port Configuration   : 6=Port 1   7=Port 2

  Esc=Exit Program


Press 'Y' key to confirm configuration receive!

Receiving configuration file:


TRANSFERRING CONFIGURATION FROM PC TO ProSoft MODULE:
Using the Ymodem file transfer protocol.  Select the SEND
menu option and transfer the configuration file.

CCC
```

The Send File dialog appears.

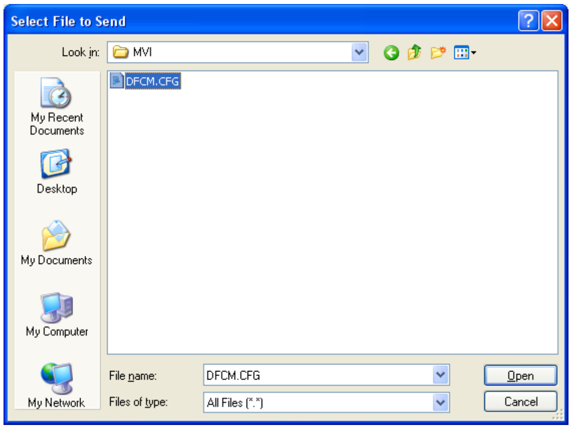


Folder: C:\Documents and Settings\mrodrigues

Filename:

Protocol: Ymodem

5. Browse to the location where the configuration file resides on your PC.



File name: DFCM.CFG

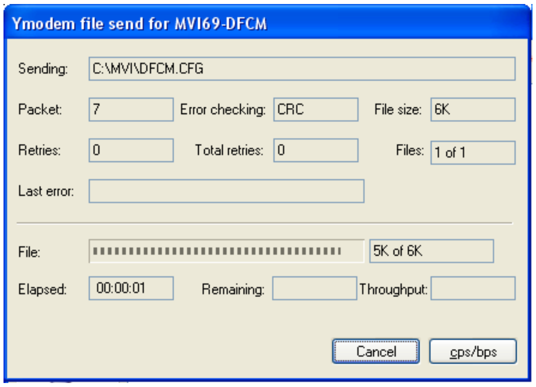
Files of type: All Files (*.*)

Note: This procedure assumes that you are uploading a newly edited configuration file from your PC to the module. However, configuration files are also available on the ProSoft CD as well as the ProSoft Technology website.

6. Select the configuration file and click Open.

7. Select Ymodem as the protocol.

8. Click the Send button. The progress screen appears.



Sending: C:\MVI\DFCM.CFG

Packet: 7 Error checking: CRC File size: 6K

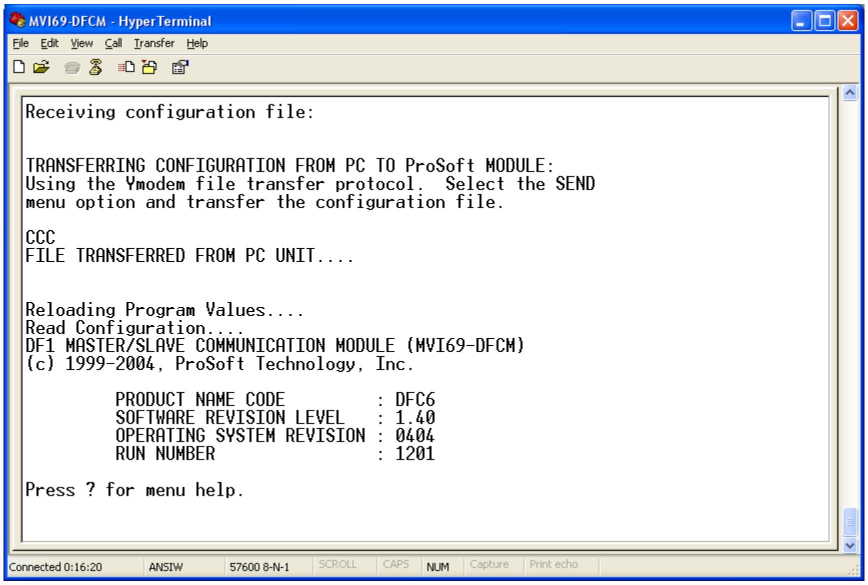
Retries: 0 Total retries: 0 Files: 1 of 1

Last error:

File: 5K of 6K

Elapsed: 00:00:01 Remaining: Throughput:

When the upload is complete, the screen indicates that the module has reloaded program values and displays information about the module.



```
Receiving configuration file:


TRANSFERRING CONFIGURATION FROM PC TO ProSoft MODULE:
Using the Ymodem file transfer protocol.  Select the SEND
menu option and transfer the configuration file.

CCC
FILE TRANSFERRED FROM PC UNIT....


Reloading Program Values....
Read Configuration....
DF1 MASTER/SLAVE COMMUNICATION MODULE (MVI69-DFCM)
(c) 1999-2004, ProSoft Technology, Inc.

         PRODUCT NAME CODE          : DFC6
         SOFTWARE REVISION LEVEL    : 1.40
         OPERATING SYSTEM REVISION : 0404
         RUN NUMBER                 : 1201

Press ? for menu help.
```

Your module now contains the new configuration.

Appendix G – Command Function Codes

This section details DF1 commands to be configured by the user.

Module Information Data ← | → Device Information Data

DF1 COMMAND LIST FORM

1	2	3	4	5	6	7	8	9	10	11
Enable Code	**Internal Address**	**Poll Interval Time**	**Count**	**Swap Code**	**Node Address**	**Function Code**	**Function Parameters**			

FUNCTION CODE #1
Protected Write (Basic Command Set)

Column	Command Parameter	Description	Parameter
1	Enable/Type Word	0=Disabled, 1=Continuous and 2=Conditional.	
2	Virtual Database Address	This parameter defines the database address of the first data point to be associated with the command.	
3	Poll Interval	Minimum number of seconds to wait before polling with this command.	
4	Count	Number of data word values to be considered by the function.	
5	Swap Type Code	Swap type code for command: 0=None, 1=Swap words, 2=Swap words & bytes and 3=swap bytes in each word.	
6	Node Address	Address of unit to reach on the data highway.	
7	Function Code = 1	Protected Write Function	
8	Word Address	Word address where to start the write operation.	P1
9 to 11	Not Used	These fields are not used by the command. Values entered in these columns will be ignored.	P2 to P4

This function writes one or more words of data into a limited area of the slave device.

FUNCTION CODE #2
Unprotected Read (Basic Command Set)

Column	Command Parameter	Description	Parameter
1	Enable/Type Word	0=Disabled and 1=Continuous.	
2	Virtual Database Address	This parameter defines the database address of the first data point to be associated with the command.	
3	Poll Interval	Minimum number of seconds to wait before polling with this command.	
4	Count	Number of data word values to be considered by the function.	
5	Swap Type Code	Swap type code for command: 0=None, 1=Swap words, 2=Swap words & bytes and 3=swap bytes in each word.	
6	Node Address	Address of unit to reach on the data highway.	
7	Function Code = 2	Unprotected Read Function	
8	Word Address	Word address where to start the read operation.	P1
9 to 11	Not Used	These fields are not used by the command. Values entered in these columns will be ignored.	P2 to P4

This function reads one or more words of data from the PLC memory.

FUNCTION CODE #3
Protected Bit Write (Basic Command Set)

Column	Command Parameter	Description	Parameter
1	Enable/Type Word	0=Disabled, 1=Continuous and 2=Conditional.	
2	Virtual Database Address	This parameter defines the database address for the data to be associated with the command. The address defined represents a register address and not a bit address. This function will update one or more words of data as defined by the count parameter.	
3	Poll Interval	Minimum number of seconds to wait before polling with this command.	
4	Count	Number of data word values to be considered by the function.	
5	Swap Type Code	Swap type code for command: Always zero (0).	
6	Node Address	Address of unit to reach on the data highway.	
7	Function Code = 3	Protected Bit Write Function	
8	Word Address	Word address where to start the write operation.	P1
9 to 11	Not Used	These fields are not used by the command. Values entered in these columns will be ignored.	P2 to P4

This function sets or resets individual bits within a limited area of the PLC data table.

FUNCTION CODE #4
Unprotected Bit Write (Basic Command Set)

Column	Command Parameter	Description	Parameter
1	Enable/Type Word	0=Disabled, 1=Continuous and 2=Conditional.	
2	Virtual Database Address	This parameter defines the database address for the data to be associated with the command. The address defined represents a register address and not a bit address. This function will update one or more words of data as defined by the count parameter.	
3	Poll Interval	Minimum number of seconds to wait before polling with this command.	
4	Count	Number of data word values to be considered by the function.	
5	Swap Type Code	Swap type code for command: Always zero (0).	
6	Node Address	Address of unit to reach on the data highway.	
7	Function Code = 4	Unprotected Bit Write Function	
8	Word Address	Word address where to start the write operation.	P1
9 to 11	Not Used	These fields are not used by the command. Values entered in these columns will be ignored.	P2 to P4

This function sets or resets individual bits within a limited area of the PLC data table.

FUNCTION CODE #5
Unprotected Write (Basic Command Set)

Column	Command Parameter	Description	Parameter
1	Enable/Type Word	0=Disabled, 1=Continuous and 2=Conditional.	
2	Virtual Database Address	This parameter defines the database address of the first data point to be associated with the command.	
3	Poll Interval	Minimum number of seconds to wait before polling with this command.	
4	Count	Number of data word values to be considered by the function.	
5	Swap Type Code	Swap type code for command: 0=None, 1=Swap words, 2=Swap words & bytes and 3=swap bytes in each word.	
6	Node Address	Address of unit to reach on the data highway.	
7	Function Code = 5	Unprotected Write Function	
8	Word Address	Word address where to start the write operation.	P1
9 to 11	Not Used	These fields are not used by the command. Values entered in these columns will be ignored.	P2 to P4

This function writes one or more words of data to the PLC memory.

FUNCTION CODE #100
Word Range Write (PLC-5 Command)(Binary Address)

Column	Command Parameter	Description	Parameter
1	Enable/Type Word	0=Disabled, 1=Continuous and 2=Conditional.	
2	Virtual Database Address	This parameter defines the database address of the first data point to be associated with the command.	
3	Poll Interval	Minimum number of seconds to wait before polling with this command.	
4	Count	Number of data word values to be considered by the function.	
5	Swap Type Code	Swap type code for command: 0=None, 1=Swap words, 2=Swap words & bytes and 3=swap bytes in each word.	
6	Node Address	Address of unit to reach on the data highway.	
7	Function Code = 100	Word Range Write Command.	
8	File Number	PLC-5 file number to be associated with the command. If a value of -1 is entered for the parameter, the field will not be used in the command, and the default file will be used.	P1
9	Element Number	The parameter defines the element in the file where write operation will start. If a value of -1 is entered for the parameter, the field will not be used in the command, and the default element will be used.	P2
10	Sub-Element Number	This parameter defines the sub-element to be used with the command. Refer to the AB documentation for a list of valid sub-element codes. If the value is set to -1, the default sub-element number will be used.	P3
11	Not Used	This field is not used by the command. Values entered in this column will be ignored.	P4

This function is used to write one or more words of data to a PLC data table.

FUNCTION CODE #101
Word Range Read (PLC-5 Command)(Binary Address)

Column	Command Parameter	Description	Parameter
1	Enable/Type Word	0=Disabled and 1=Continuous.	
2	Virtual Database Address	This parameter defines the database address of the first data point to be associated with the command.	
3	Poll Interval	Minimum number of seconds to wait before polling with this command.	
4	Count	Number of data word values to be considered by the function.	
5	Swap Type Code	Swap type code for command: 0=None, 1=Swap words, 2=Swap words & bytes and 3=swap bytes in each word.	
6	Node Address	Address of unit to reach on the data highway.	
7	Function Code = 101	Word Range Write Command.	
8	File Number	PLC-5 file number to be associated with the command. If a value of -1 is entered for the parameter, the field will not be used in the command, and the default file will be used.	P1
9	Element Number	The parameter defines the element in the file where write operation will start. If a value of -1 is entered for the parameter, the field will not be used in the command, and the default element will be used.	P2
10	Sub-Element Number	This parameter defines the sub-element to be used with the command. Refer to the AB documentation for a list of valid sub-element codes. If the value is set to -1, the default sub-element number will be used.	P3
11	Not Used	This field is not used by the command. Values entered in this column will be ignored.	P4

This function is used to read one or more words of data from a PLC data table.

FUNCTION CODE #102
Read-Modify-Write (PLC-5 Command)(Binary Address)

Column	Command Parameter	Description	Parameter
1	Enable/Type Word	0=Disabled, 1=Continuous and 2=Conditional.	
2	Virtual Database Address	This parameter defines the database address for the data to be associated with the command.	
3	Poll Interval	Minimum number of seconds to wait before polling with this command.	
4	Count	Number of data word values to be considered by the function.	
5	Swap Type Code	Swap type code for command: Always zero (0).	
6	Node Address	Address of unit to reach on the data highway.	
7	Function Code = 102	Read-Modify-Write Command.	
8	File Number	PLC-5 file number to be associated with the command. If a value of -1 is entered for the parameter, the field will not be used in the command, and the default file will be used.	P1
9	Element Number	The parameter defines the element in the file where write operation will start. If a value of -1 is entered for the parameter, the field will not be used in the command, and the default element will be used.	P2
10	Sub-Element Number	This parameter defines the sub-element to be used with the command. Refer to the AB documentation for a list of valid sub-element codes. If the value is set to -1, the default sub-element number will be used.	P3
11	Not Used	This field is not used by the command. Values entered in this column will be ignored.	P4

This function is used to write one or more words of data to a PLC data table. This function should work on the following devices: PLC-5. The command constructed contains an AND mask and an OR mask. Values in the AND mask have the following definitions: 0=Reset and 1=Leave the Same. Values in the OR mask have the following definitions: 0=Leave the Same and 1=Set. The module is responsible for setting the mask values to correctly construct the message from the virtual database values.

FUNCTION CODE #150
Word Range Write (PLC-5 Command)(ASCII Address)

Column	Command Parameter	Description	Parameter
1	Enable/Type Word	0=Disabled, 1=Continuous and 2=Conditional.	
2	Virtual Database Address	This parameter defines the database address of the first data point to be associated with the command.	
3	Poll Interval	Minimum number of seconds to wait before polling with this command.	
4	Count	Number of data word values to be considered by the function.	
5	Swap Type Code	Swap type code for command: 0=None, 1=Swap words, 2=Swap words & bytes and 3=swap bytes in each word.	
6	Node Address	Address of unit to reach on the data highway.	
7	Function Code = 150	Word Range Write Command.	
8	File String	PLC-5 address as specified as an ASCII string. For example, N10:300.	P1
9 to 11	Not Used	These fields are not used by the command. Values entered in these columns will be ignored.	P2 to P4

This function is used to write one or more words of data to a PLC data table.

FUNCTION CODE #151
Word Range Read (PLC-5 Command)(ASCII Address)

Column	Command Parameter	Description	Parameter
1	Enable/Type Word	0=Disabled and 1=Continuous.	
2	Virtual Database Address	This parameter defines the database address of the first data point to be associated with the command.	
3	Poll Interval	Minimum number of seconds to wait before polling with this command.	
4	Count	Number of data word values to be considered by the function.	
5	Swap Type Code	Swap type code for command: 0=None, 1=Swap words, 2=Swap words & bytes and 3=swap bytes in each word.	
6	Node Address	Address of unit to reach on the data highway.	
7	Function Code = 151	Word Range Read Command.	
8	File String	PLC-5 address as specified as an ASCII string. For example, N10:300.	P1
9 to 11	Not Used	These fields are not used by the command. Values entered in these columns will be ignored.	P2 to P4

This function is used to read one or more words of data from a PLC data table.

FUNCTION CODE #152
Read-Modify-Write (PLC-5 Command)(ASCII Address)

Column	Command Parameter	Description	Parameter
1	Enable/Type Word	0=Disabled, 1=Continuous and 2=Conditional.	
2	Virtual Database Address	This parameter defines the database address for the data to be associated with the command. The first database register is used as the AND mask for the command, and the second is used for the OR mask. Values in the AND mask have the following definitions: 0=Reset and 1=Leave the Same. Values in the OR mask have the following definitions: 0=Leave the Same and 1=Set.	
3	Poll Interval	Minimum number of seconds to wait before polling with this command.	
4	Count	Number of data word values to be considered by the function.	
5	Swap Type Code	Swap type code for command: Always zero (0).	
6	Node Address	Address of unit to reach on the data highway.	
7	Function Code = 152	Read-Modify-Write Command.	
8	File String	PLC-5 address as specified as an ASCII string. For example, N10:300.	P1
9 to 11	Not Used	These fields are not used by the command. Values entered in these columns will be ignored.	P2 to P4

This function is used to write one or more words of data to a PLC data table. This function should work on the following devices: PLC-5. The command constructed contains an AND mask and an OR mask. Values in the AND mask have the following definitions: 0=Reset and 1=Leave the Same. Values in the OR mask have the following definitions: 0=Leave the Same and 1=Set. The module is responsible for setting the mask values to correctly construct the message from the virtual database values.

FUNCTION CODE #501
Protected Typed Logical Read (Two Address Fields)

Column	Command Parameter	Description	Parameter
1	Enable/Type Word	0=Disabled and 1=Continuous.	
2	Virtual Database Address	This parameter defines the database address of the first data point to be associated with the command.	
3	Poll Interval	Minimum number of seconds to wait before polling with this command.	
4	Count	Number of data word values to be considered by the function.	
5	Swap Type Code	Swap type code for command: 0=None, 1=Swap words, 2=Swap words & bytes and 3=swap bytes in each word.	
6	Node Address	Address of unit to reach on the data highway.	
7	Function Code = 501	Logical Read Command	
8	File Type	SLC file type letter as used in file name string. Valid values for the system are N, S, F, A, ….	P1
9	File Number	SLC file number to be associated with the command.	P2
10	Element Number	The parameter defines the element in the file where write operation will start.	P3
11	Not Used	This field is not used by the command. Values entered in this column will be ignored.	P4

This function is used to read one or more words of data from a PLC data table.

FUNCTION CODE #502
Protected Typed Logical Read (Three Address Fields)

Column	Command Parameter	Description	Parameter
1	Enable/Type Word	0=Disabled and 1=Continuous.	
2	Virtual Database Address	This parameter defines the database address of the first data point to be associated with the command.	
3	Poll Interval	Minimum number of seconds to wait before polling with this command.	
4	Count	Number of data word values to be considered by the function.	
5	Swap Type Code	Swap type code for command: 0=None, 1=Swap words, 2=Swap words & bytes and 3=swap bytes in each word.	
6	Node Address	Address of unit to reach on the data highway.	
7	Function Code = 502	Logical Read Command	
8	File Type	SLC file type letter as used in file name string. Valid values for the system are N, S, F, A, ….	P1
9	File Number	SLC file number to be associated with the command.	P2
10	Element Number	The parameter defines the element in the file where write operation will start.	P3
11	Sub-Element Number	This parameter defines the sub-element to be used with the command. Refer to the AB documentation for a list of valid sub-element codes.	P4

This function is used to read one or more words of data from a PLC data table.

FUNCTION CODE #509
Protected Typed Logical Write (Two Address Fields)

Column	Command Parameter	Description	Parameter
1	Enable/Type Word	0=Disabled, 1=Continuous and 2=Conditional.	
2	Virtual Database Address	This parameter defines the database address of the first data point to be associated with the command.	
3	Poll Interval	Minimum number of seconds to wait before polling with this command.	
4	Count	Number of data word values to be considered by the function.	
5	Swap Type Code	Swap type code for command: 0=None, 1=Swap words, 2=Swap words & bytes and 3=swap bytes in each word.	
6	Node Address	Address of unit to reach on the data highway.	
7	Function Code = 509	Logical Write Command	
8	File Type	SLC file type letter as used in file name string. Valid values for the system are N, S, F, A, ….	P1
9	File Number	SLC file number to be associated with the command.	P2
10	Element Number	The parameter defines the element in the file where write operation will start.	P3
11	Not Used	This field is not used by the command. Values entered in this column will be ignored.	P4

This function is used to write one or more words of data to a PLC data table.

FUNCTION CODE #510
Protected Typed Logical Write (Three Address Fields)

Column	Command Parameter	Description	Parameter
1	Enable/Type Word	0=Disabled, 1=Continuous and 2=Conditional.	
2	Virtual Database Address	This parameter defines the database address of the first data point to be associated with the command.	
3	Poll Interval	Minimum number of seconds to wait before polling with this command.	
4	Count	Number of data word values to be considered by the function.	
5	Swap Type Code	Swap type code for command: 0=None, 1=Swap words, 2=Swap words & bytes and 3=swap bytes in each word.	
6	Node Address	Address of unit to reach on the data highway.	
7	Function Code = 510	Logical Write Command	
8	File Type	SLC file type letter as used in file name string. Valid values for the system are N, S, F, A, ….	P1
9	File Number	SLC file number to be associated with the command.	P2
10	Element Number	The parameter defines the element in the file where write operation will start.	P3
11	Sub-Element Number	This parameter defines the sub-element to be used with the command. Refer to the AB documentation for a list of valid sub-element codes.	P4

This function is used to write one or more words of data to a PLC data table.

FUNCTION CODE #511
Protected Typed Logical Write with Mask (Three Address Fields)

Column	Command Parameter	Description	Parameter
1	Enable/Type Word	0=Disabled, 1=Continuous and 2=Conditional.	
2	Virtual Database Address	This parameter defines the database address of the data to be associated with the command. The first word of data contains the bit mask and the second word contains the data.	
3	Poll Interval	Minimum number of seconds to wait before polling with this command.	
4	Count	Number of data word values to be considered by the function.	
5	Swap Type Code	Swap type code for command: Always zero (0).	
6	Node Address	Address of unit to reach on the data highway.	
7	Function Code = 511	Logical Write with mask	
8	File Type	SLC file type letter as used in file name string. Valid values for the system are N, S, F, A, ….	P1
9	File Number	SLC file number to be associated with the command.	P2
10	Element Number	The parameter defines the element in the file where write operation will start.	P3
11	Sub-Element Number	This parameter defines the sub-element to be used with the command. Refer to the AB documentation for a list of valid sub-element codes.	P4

This function is used to write one or more words of data from a PLC data table controlling individual bits in the table. The bit mask used for the command is 0xFFFF. This provides direct manipulation of the data in the device with the internal data of the module. The function requires that all data associated with the command use the same mask.

Support, Service, and Warranty

Technical Support

ProSoft Technology survives on its ability to provide meaningful support to its customers. Should any questions or problems arise, please feel free to contact us at:

Factory/Technical Support
ProSoft Technology, Inc.
1675 Chester Avenue, 4th Floor
Bakersfield, CA 93301
(661) 716-5100
(661) 716-5101 (fax)
E-mail address: prosoft@prosoft-technology.com
Web Site: http://www.prosoft-technology.com

Before calling for support, please prepare yourself for the call. In order to provide the best and quickest support possible, we will most likely ask for the following information (you may wish to fax it to us prior to calling):

1. Product Version Number
2. System hierarchy
3. Module configuration and contents of xxxx.CFG file
4. Module Operation
   - Configuration/Debug status information
   - LED patterns
5. Information about the processor and controller tags as viewed through RSLogix 500 and LED patterns on the processor
6. Details about the serial network

An after-hours answering system (on the Bakersfield number) allows pager access to one of our qualified technical and/or application support engineers at any time to answer the questions that are important to you.

Module Service and Repair

The MVI69-DFCM card is an electronic product, designed and manufactured to function under somewhat adverse conditions. As with any product, through age, misapplication, or any one of many possible problems the card may require repair.

When purchased from ProSoft Technology, the module has a one-year parts and labor warranty according to the limits specified in the warranty. Replacement and/or returns should be directed to the distributor from whom the product was purchased. If you need to return the card for repair, obtain an RMA number from ProSoft Technology. Please call the factory for this number and display the number prominently on the outside of the shipping carton used to return the card.

General Warranty Policy

ProSoft Technology, Inc. (Hereinafter referred to as ProSoft) warrants that the Product shall conform to and perform in accordance with published technical specifications and the accompanying written materials, and shall be free of defects in materials and workmanship, for the period of time herein indicated, such warranty period commencing upon receipt of the Product.

This warranty is limited to the repair and/or replacement, at ProSoft's election, of defective or non-conforming Product, and ProSoft shall not be responsible for the failure of the Product to perform specified functions, or any other non-conformance caused by or attributable to: (a) any misapplication or misuse of the Product; (b) failure of Customer to adhere to any of ProSoft's specifications or instructions; (c) neglect of, abuse of, or accident to, the Product; or (d) any associated or complementary equipment or software not furnished by ProSoft.

Limited warranty service may be obtained by delivering the Product to ProSoft and providing proof of purchase or receipt date. Customer agrees to insure the Product or assume the risk of loss or damage in transit, to prepay shipping charges to ProSoft, and to use the original shipping container or equivalent. Contact ProSoft Customer Service for further information.

Limitation of Liability

EXCEPT AS EXPRESSLY PROVIDED HEREIN, PROSOFT MAKES NO WARRANT OF ANY KIND, EXPRESSED OR IMPLIED, WITH RESPECT TO ANY EQUIPMENT, PARTS OR SERVICES PROVIDED PURSUANT TO THIS AGREEMENT, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANT ABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NEITHER PROSOFT OR ITS DEALER SHALL BE LIABLE FOR ANY OTHER DAMAGES, INCLUDING BUT NOT LIMITED TO DIRECT, INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES, WHETHER IN AN ACTION IN CONTRACT OR TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY), SUCH AS, BUT NOT LIMITED TO, LOSS OF ANTICIPATED PROFITS OR BENEFITS RESULTING FROM, OR ARISING OUT OF, OR IN CONNECTION WITH THE USE OR FURNISHING OF EQUIPMENT, PARTS OR SERVICES HEREUNDER OR THE PERFORMANCE, USE OR INABILITY TO USE THE SAME, EVEN IF PROSOFT OR ITS DEALER'S TOTAL LIABILITY EXCEED THE PRICE PAID FOR THE PRODUCT.

Where directed by State Law, some of the above exclusions or limitations may not be applicable in some states. This warranty provides specific legal rights; other rights that vary from state to state may also exist. This warranty shall not be applicable to the extent that any provisions of this warranty are prohibited by any Federal, State or Municipal Law that cannot be preempted.

Hardware Product Warranty Details

Warranty Period: ProSoft warranties hardware product for a period of one (1) year.

Warranty Procedure: Upon return of the hardware Product ProSoft will, at its option, repair or replace Product at no additional charge, freight prepaid, except as set forth below. Repair parts and replacement Product will be furnished on an exchange basis and will be either reconditioned or new. All replaced Product and parts become the property of ProSoft. If ProSoft determines that the Product is not under warranty, it will, at the Customer's option, repair the Product using current ProSoft standard rates for parts and labor, and return the Product freight collect.

Return Policy

We strive to provide the best products available. Your satisfaction is important to us.

All returned products must be marked with a Returned Merchandise Authorization number. Units under warranty returned because of defects must be pre-approved by the Technical Support Department to obtain an RMA #.

To return a unit under warranty:

Defective Units: Contact the Technical Support Department for approval on all defective returns. Phone 661-716-5100 or email support@prosoft-technology.com. Defective units under warranty will be immediately replaced.

Return for Credit Only: Contact your original purchasing distributor for an RMA #. Returns for order error, quantity error, project change, etc., are subject to restocking charges:

10% restocking fee if factory seal has not been broken
20% restocking fee if factory seal has been broken
All cables and accessories must be intact or additional charges may apply.

If you do not know who your distributor is, contact our Returns Department at 661-716-5100 or by email at prosoft@prosoft-technology.com. All invoicing will be billed through the original purchasing distributor. For warranty claims on a defective unit, an invoice for the replacement will be generated and credit will be issued when the defective unit is returned and a manufacturer defect is found. If the defect is not manufacturer related, credit will not be issued and payment for the replacement is due. To return a non-warranty unit for repair, contact the Technical Support Department.

Product Warranty Information

ProSoft Technology, Inc. products, excepting RadioLinx™ products, are warranted to be free from any defect in material and workmanship for a period of one (1) year from the date of shipment.

RadioLinx radios are warranted to be free from any defect in material and workmanship for a period of three (3) years from the date of shipment. Radio accessory items (antennas, cables, etc.) are **non-refundable** items and cannot be returned for credit.

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